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Canada's Farm Population

by Fred Shaw



Census Analytical Study

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Canada's Farm Population:

Analysis of Income and Related Characteristics

By Paul Shaw



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FOREWORD

The Canadian censuses constitute a rich source of information about the condition of groups and communities of Canadians, extending over many years. It has proved to be worthwhile in Canada, as in some other countries, to supplement census statistical reports with analytical monographs on a number of selected topics. The 1931 Census was the basis of several valuable monographs but, for various reasons, it was impossible to follow this precedent with a similar program until 1961. The 1961 Census monographs received good public reception, and have been cited repeatedly in numerous documents that deal with policy problems in diverse fields such as manpower, urbanization, income, the status of women, and marketing. They were also of vital importance in the evaluation and improvement of the quality and relevance of Statistics Canada social and economic data. This successful experience led to the decision to continue the program of census analytical studies. The present series of analyses is focused largely on the results of the 1971 Census.

The purpose of these studies is to provide a broad analysis of social and economic phenomena in Canada. Although the studies concentrate on the results of the 1971 Census, they are supplemented by data from several other sources. These reports are written in such a way that their main conclusions and supporting discussion can be understood by a general audience of concerned citizens and officials, who often lack the resources needed to interpret and digest the rows of numbers that appear in census statistical bulletins. For these persons, interpretive texts that bring the dry statistics to life are a vital dimension of the dissemination of data from a census. Such texts are often the only means that concerned citizens and officials have to personally perceive benefits from the national investment in the census. This particular report is one of a series planned to be published concerning a variety of aspects of Canadian life, including income, language use, farming, family composition, migration, adjustment of immigrants, human fertility, labour force participation, housing, commuting and population distribution.

I should like to express my appreciation to the universities that have made it possible for members of their staff to contribute to this program, to authors within Statistics Canada who have freely put forth extra effort outside office hours in preparing their studies, and to a number of other members of Statistics Canada staff who have given assistance. The Social Science Federation of Canada has been particularly helpful in the selection of authors for some of the studies, and in arranging for review of several manuscripts. In addition, thanks are extended to the various readers, experts in their fields, whose comments were of considerable assistance to the authors.

Although the monographs have been prepared at the request of and published by Statistics Canada, responsibility for the analyses and conclusions is that of the individual authors.

PETER G. KIRKHAM,
Chief Statistician of Canada.

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Many people have contributed to the realization of this study. Bob Ellis, Director, Census of Agriculture, has overseen and encouraged all stages of the Agriculture-Population Linkage and production of this monograph. Wilson Freeman (also of the Census of Agriculture) has been responsible for fast, efficient access to an incredible amount of statistical data. Ray Davey (then, Director, Census of Population) was most helpful in allocating staff and resources to overcome the initial difficulties of linking two national censuses and the preparation of a barrage of useful Agriculture-Population cross-tabulations. Leroy Stone (Program Manager, 1971 Census Analytical Studies Programme) has skillfully directed the scheduling, production and publication of this monograph.

Thanks are also due to David Bond (then, Director General: Census) for his encouragement behind my involvement; to Julius Mage (University of Guelph) and James MacMillan (University of Manitoba) for their comments on an earlier draft; to Gerry Quinn, Juan Scott, Herb Scott, Roman Brzezinski, Roméo Cinq-Mars and Bob Huang (Census of Agriculture) who have each helped me in many ways; to Joseph Van den Boomen and Louise Kantrow (United Nations) for their encouragement while I was preparing the study; to Richard Holmes for computer assistance and Bonnie Roberts for clerical and typing assistance.

R. Paul Shaw,
August 1976.



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CHAPTER 1

INTRODUCTION

In most countries, the effectiveness of national agricultural policy is hampered by embarrassing information gaps and critical vacuums in knowledge about the socio-economic status, opportunities and performance of farm population.¹ Canada is no exception. Today's most perplexing problems in Canada's farm sector are population-related: farm families are not enjoying levels of living equal to the rest of the economy; there is inadequate utilization of farm manpower; and there is instability in the rate of growth and distribution of economic prosperity (Anderson, 1967; Gilson, 1967; Fitzpatrick, 1965; Purnell and Heighton, 1970; Bawden, 1973; Plaunt, 1971, 1973). While policy interventions have been called upon to remedy these problems, success is often limited because researchers are not able to identify and evaluate farm population subgroups which contribute to and are most affected by these problems (Dawson, 1967, 1969).

To illustrate, there is good reason to suspect that the income of a large percentage of Canada's farm families is below the Economic Council of Canada's "poverty line" (FTFA, 1969). Where these families are, however, or whether their problems are compounded by small farm size, small capital base, lack of off-farm employment opportunities or inadequate operator management skills is very poorly understood (FTFA, 1969). Ramifications for policy are that it is difficult to advocate consolidation of farms, provision of credit to small or marginal farms, programs for up-grading farm operator skills or relocation of farm families, without first collecting and analyzing income data which relate to particular types of problems requiring particular types of solutions. This need is especially relevant to Canada's Federal Task Force and its National Agricultural Advisory Council, which has paid increasing attention to possible means of improving farm efficiency and competitiveness by assisting families on non-viable farms to leave agriculture, improving farm management, etc.

Our point of departure is that the human factor in Canadian agriculture has long been neglected. To illustrate, over the last 10 years, Canada's leading agricultural journal, the *Canadian Journal of Agricultural Economics*, has devoted a meagre 6.4% of its literature to the socio-economic aspects of Canada's farm population (Bawden, 1973). Part of the problem stems from failure to emphasize analysis of quantity, quality and distribution of Canada's farm population in studies of farm productivity. This is amply illustrated in Canada's Federal Task Force on Agriculture (FTFA, 1969) which focuses largely on census and survey data concerning crops, prices and volume rather than on the real income of farmers and farms. The plight of the poor farmer is confined to a rather brief 16 pages of the report, making it difficult to gain a balanced perspective on the human side of the equation.

See footnotes on page 24.

In most developed and less developed countries alike, neglect of the human factor stems from the inadequacy of available data. For example, Canada's largest data source — the Census of Population — provides basic data only on demographic and economic characteristics of Canada's rural population residing on census-farms. Previous to 1971, census tabulations treated Canada's rural farm population primarily as an aggregate. Components such as farm operators, their wives and family members had not been identified and characterized in socio-economic terms. As a result, data on Canada's farm operators and their dependents are particularly fragmentary. In no case are the socio-economic characteristics of various farm population subgroups related to the characteristics of their respective farm operations.

As for the Census of Agriculture, it is a farm enterprise-oriented enumeration, providing only limited data on Canada's farm operators. Furthermore, farm expenditure patterns, with the exception of a few principal items, have not been part of the Census of Agriculture since 1941. *Farm Net Income*, the only annual publication in this area, covers components of aggregate expenditures and receipts only. As a consequence, research workers have been at a disadvantage in developing income distribution and expenditure patterns for agriculture. (For beginnings in this area, see Fitzpatrick, 1965, Davey and Haasan, 1974.) In a sector as heterogeneous as agriculture, providing averages of incomes without understanding their distribution is misleading, and the path of the misinformed is strewn with many pitfalls.

One does not need to look far to realize that the paucity of data and knowledge alluded to above represents an important potential pitfall in the formulation of sound Canadian agricultural policy. For example:

1. If Canada's recently formed Small Farm Development Program is to succeed in strengthening viable farms and the orderly elimination of marginal farms at the lower range of the size distribution, a good deal of regional analysis of the matrix of returns to farming vis-à-vis farm operator characteristics will be required (Plaunt, 1971, 1973).²

2. In the past, the Department of Regional Economic Expansion, the Canadian Department of Agriculture, the Economic Council of Canada and the Department of Manpower and Immigration have been forced to rely on isolated surveys, expert opinion and guesstimates as to the kinds of measures required to increase farm performance, smooth out the structural transformation of the agricultural economy and provide for the needs of economically non-viable farms (Buckley, *et al.*, 1967).

3. There has been serious questioning of the viability of the family farm concept in the face of a trend toward (i) larger, more capital-intensive farms, (ii) an increasing role of a non-farm infrastructure in the processing and distribution of farm goods, and (iii) increasing dependence of farmers on non-farm income and

See footnotes on page 24.

employment. Indeed, the race toward bigger business has often been interpreted as heralding the doom of the family farm. It would seem particularly important in discussing policy interpretations of the family farm concept to evaluate (a) the extent to which productive effort and its return are vested in the family, (b) to what extent Canada's family farms are a primary agricultural business with operators as the risk-takers, who with their families, do most of the farm work and perform most of the managerial activities, and (c) the major source of income of seemingly part-time farm operators and the extent to which their farms add to or subtract from their over-all incomes.

Questions such as these are hardly new; they have hounded agricultural policy-makers and researchers for years. Accordingly, as Canada's major data disseminating agency, Statistics Canada has sought new ways of filling data gaps in the socio-economic profile of Canada's farm population. This study is the result of a project aimed at meeting this need. The project has been labelled the 1971 Census Agriculture-Population Linkage (hereafter, Ag-Pop Linkage).

1.1. Background to the 1971 Ag-Pop Linkage

Between 1965 - 68, consideration was given to ways of making maximum use of the vast amounts of independently enumerated, tabulated and stored agricultural data in national census data banks. After considering a number of retrieval possibilities, those dealing with the problem decided to develop a computerized record linkage of the forthcoming 1971 Censuses of Agriculture and Population. Spurred by a 1947 United Nations recommendation on the merits of such a strategy (United Nations, 1947), positive results obtained in a few manual collation projects in Canada and the United States, and seemingly reasonable cost estimates for such a project (about \$400,000), the Census Division embarked on a program to develop an extensive computerized Ag-Pop Linkage. To the writer's knowledge, the Canadian census 100% linkage program and the resulting data base have not been attempted in any other country.

Briefly, the Ag-Pop Linkage was conceptualized as:

- (a) collation of the complete results of Canada's national Censuses of Agriculture and Population as an effective way to extend presently limited sources of socio-economic data on the economy's farm population; and
- (b) the "bringing together" of agriculture and population statistics so as to relate successive events in the performance of farm units with the socio-economic characteristics of the respective farm operators and members of their households.

As details on the linkage are presented elsewhere (see Shaw, 1971, 1975b, and Appendix A.1), it will suffice to say that performance of the Ag-Pop Linkage was considerably better than expected. About 98% of the 366,000 Ag-Pop records linked successfully on the first attempt. Numerous Census of Agriculture bulletins

summarizing Ag-Pop statistics are now in circulation. Our only word of warning is that tabulated data for this study have been produced primarily for analytical purposes and do not replicate, exactly, farm counts, etc., which are found in regular 1971 Census of Agriculture publications. It should be kept in mind when reading tables presented in this study that figures may show a $\pm 2\%$ variance from similar counts as reported solely from the 1971 Census of Agriculture.³

Utilization of the data has been enhanced by a highly efficient and economical retrieval system (see Appendix A.1) which permits retrieval of a wide range of variables (see Appendix A.2) for user-specified geographical areas. Readers are encouraged to consider the dimensions of the new data base, prospects for retrieval and ways in which the data base could be used to broaden and extend research on the kinds of issues raised above.

1.2. Assets and Limitations of the Ag-Pop Data Base

Use of the Ag-Pop Linkage data for analytical purposes has a number of well-known assets including:

- (a) large sample coverage of detailed individual, family and farm enterprise characteristics (100% basic household coverage and 33.3% sample coverage in the case of the Census of Population; 100% detailed coverage of all farms in the case of the Census of Agriculture);
- (b) for the first time, availability of data on total farm family income and its components for Canada and small-area units;
- (c) an incredible amount of preparatory work in designing and pretesting questionnaires, involving both census experts and representatives from various business and government interests;
- (d) systematic quality control in enumeration and processing of data; and
- (e) coverage of a large number of items that respondents are required, by law, to complete on the questionnaire, under assurance of confidentiality.

At the same time, there are a number of limitations in using census data, particularly when the topic at hand concerns farm enterprises. Some limitations which have influenced our approach to questions in this study include the following:

- (a) given census confidentiality rules, it is not possible to obtain individual farm records. Thus, our analysis is limited to behaviour of aggregates (e.g., average characteristics or aggregate distributions for census divisions). This implies that multi-variate analysis (e.g., correlation, regression) is forced to rely on interpretation of areal co-variation between measures of farm performance, etc. It also implies that our study will do better to focus on the general

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structural attributes of Canada's census-farm population and broad correlates of farm incomes, etc., than to seek rigorously calibrated elasticities of farm input and farm performance relationships;

- (b) there is no way of checking on the truthfulness of replies to income questions. As is well known, incomes are typically understated on questionnaires; this implies that census measurement of absolute income levels will be open to question. About all the analyst can do is (i) assume that underreporting is some constant percentage share of actual total income of all respondents, and (ii) that it is distributed evenly among all respondents. Of course, the user of census data must always be on the lookout for serious discrepancies; and
- (c) many factors known to influence returns to farming lie outside census measurement such as (i) differentials in managerial skills attributable to individual ability (versus education), risk proneness, etc., (ii) differential impact of weather variations, pestilence, luck, etc., on production, (iii) underutilization of farm holdings in cases where farms are held largely as hobby farms, as a tax write-off, or for speculative real estate purposes, and (iv) differentials and fluctuations in prices (particularly stemming from variations in export demand) and their bearing on the continuity of flow of cash incomes. With respect to the latter consideration, this means that much of our analysis is farm input or supply-related as against demand-related. Thus no attempt is made to qualify or quantify the importance of demand features on farm incomes, etc.

1.3. Statement of Objectives

Interest in the socio-economic characteristics of Canada's farm population is simply much too broad and information much too limited to justify evaluation of one particular model or a few hypotheses. Accordingly, emphasis in the chapters to follow is on exploratory analysis of the incomes and socio-economic characteristics of Canada's 1971 census-farm population.

Three broad objectives guide our inquiry:

- (a) to place the reader in touch with general demographic, geographic and socio-economic characteristics of Canada's 1971 farm population by drawing selectively on the wide range of variables in the 1971 Ag-Pop data base - many more than could possibly be described, let alone analyzed effectively in one census monograph;
- (b) to define and measure farm income with this unique set of data; and
- (c) to provide a tentative framework for synthesizing effects of human factor endowments, opportunities for off-farm work, farm enterprise characteristics and regional differentials on farm operator and farm family incomes.

By far, objectives (b) and (c) incorporate the major analytical concerns of this inquiry. Given the obvious importance of incomes to the economic well-being of Canada's census-farm population, considerable emphasis is placed on levels, sources and determinants of census-farm operator and census-farm family cash incomes.

While the third objective is crucial to understanding variations in economic returns to farming, our treatment of this subject is understandably restricted. For example, our data base is limited only to the input side of the farm productivity equation (data on prices, and other demand features are not included in our Ag-Pop data base); being a census monograph, this implies that evaluation of farm productivity in terms of quantified demand-supply relationships is largely out of the question.⁴

Of course, much of our analysis will be guided by policy problems and research questions which have arisen due to a variety of shifts, stresses and strains in Canadian agriculture over the last few decades.⁵ Before launching into specifics on Canada's 1971 farm population, the reader is encouraged to familiarize himself with trends and events that have led up to the present-day situation.

1.4. Organization of the Study

Chapter 2 summarizes what the Ag-Pop data base tells us about the more salient provincial and small-area variations in the socio-economic characteristics of Canadian farm households and families. Emphasis is on depicting structural aspects of total family incomes, contributors to family income by major source, educational and vocational training, farm family occupational and industrial activity, etc. Where interesting regional variations, socio-economic differentials or subgroup peculiarities emerge, in-depth analysis is facilitated by more detailed cross-tabulations of relevant variables. This chapter sets the stage for identifying where Canada's small, low income and large, high income farms are located, and the real socio-economic characteristics of their dependent populations.

Chapter 3 provides an in-depth analysis of relationships between incomes of farm families and performance and characteristics of family farms, and farm versus off-farm incomes of family members. Major research questions are "To what extent can the welfare of farm families (i.e., incomes, dwelling facilities, etc.) be equated with the welfare of their respective farms (i.e., gross or net returns per unit value of capital or size)?" "Are certain levels of family farm income consistently associated with certain types, sizes, tenure and location of farms?"

Chapter 4 focuses on farm operators. It analyzes differentials in farm operator characteristics and their farms according to six agricultural sales

See footnotes on page 24.

categories. The major research question is "To what extent are farm operators in each category homogeneous with respect to age, education, residence and tenure, reliance on farming as a means of livelihood, involvement in off-farm occupations, farm size, farm type, farm capital and farm expenditures? ". An objective of this chapter is to typologize the low income farm operator. By profiling the socio-economic characteristics of this farm subgroup, a crude indication of opportunities for employment elsewhere emerges. This chapter also seeks to clarify labour force characteristics of farm operators by focusing on labour force activity and class of worker during census week.

Chapter 5 addresses correlates of farm performance. It attempts to evaluate relative weights of selected non-human versus human elements in farming. Major research questions are "While controlling for farm size, capital value and type, are certain farm operator age, sex, education and family structure combinations correlated with higher returns from farming or are differentials in farm productivity tied only to characteristics of the farm *per se*? " and "What is the relationship between off-farm employment of operators of larger farms and farm production and organization? ". Toward answering these questions, particular use is made of log-normal multiple stepwise regression techniques for purposes of making crude judgments about elasticities.

Chapter 6 summarizes major findings and suggests questions for further research.

FOOTNOTES

¹ For purposes of this study, the term "policy" is defined as "direct or indirect intervention in a socio-economic system towards intentionally modifying one, some or all of its characteristics in the manner desired by the policy-maker".

² In late 1971, the Small Farm Development Program was initiated for which the federal government earmarked \$150,000,000 to be spent over the first seven years of the program. Through extended credit facilities, funds are to be made available to small farmers to secure additional land or equipment or to provide adjustment grants should the small farmer wish to sell his farm.

³ Often, the Ag-Pop computer tabulations have grand totals that differ slightly from the published Census of Agriculture tabulations. This is due to the effect of weighting in the Ag-Pop tabulations versus its absence in tabulations deriving directly from the Census of Agriculture data base. Given that discrepancies are usually very small and that such discrepancies have little bearing on our analysis of trends, differentials, etc., no attempt has been made to reconcile totals to exact comparability (see Freeman, 1976).

⁴ Further, to avoid overlap with other planned census monographs, it is not in the domain of this study to pursue, in depth, relationships between farm enterprise characteristics and part-time or marginal farmers and days of off-farm work.

⁵ An earlier version of this report contains a relevant appendix entitled "Historical Backdrop of Canada's Farm Population 1911 - 71", which can be obtained by writing to the author.

CHAPTER 2

FARM POPULATION SUBGROUPS AND INCOME MEASUREMENT

2.1. Introduction

This chapter surveys provincial variations in a select number of socio-economic characteristics of Canada's 1971 census-farm population. Sections 2.2 through 2.6 are largely descriptive in their focus on characteristics such as age and educational distribution, mobility, family membership, occupational and labour force involvement, etc. Frequently, characteristics of Canada's non-farm population are discussed for purposes of contrast. As such, Sections 2.2 through 2.6 draw selectively on a large number of socio-economic variables provided from the 1971 Ag-Pop data base towards placing the reader in touch with broad structural features of Canada's census-farm population.

The balance of the chapter deals with select income characteristics of census-farm persons, families, etc., makes comparisons with Canada's non-farm population, and sets the stage for more detailed analysis of census-farm family incomes in Chapter 3.

2.2. Demographic Structure

Canada's farm population can be defined in terms of three population subgroups. The major group consists of members of farm operator households located on census-farms (i.e., holdings of one acre or more with sales of \$50 or more over one year). The second group consists of persons residing in farm operator households not located on farms. The third consists of persons residing in households that are located on farms but do not include a farm operator. For purposes of this inquiry, the first component is termed Canada's census-farm population, the second is referred to as Canada's non-resident farm population, the third as population residing in other households on farms.

When we use the terms census-farm population, census-farm families, or census-farm persons aged 15 and over, we will be referring only to members of farm operator households resident on census-farms (i.e., census-farm population). Our use of this term differs from that of the 1971 Census of Agriculture (as reflected in its published bulletins) in that the latter includes the first and third components noted above.

Table 2.1 quantifies each component in Columns 3, 4 and 5; their total is represented in Column 1. (The Yukon and Northwest Territories have been excluded throughout this study, as they have only 18 farms in total.) This chapter focuses largely on the characteristics of Canada's 1,413,000 census-farm population (Column 3), and to a lesser extent, on characteristics of 176,000

non-resident farm population. We focus on the former group as (i) it is the largest, (ii) it corresponds most closely with traditional notions of rural farm population, and (iii) tabulations and analysis comparing resident and non-resident groups would simply consume too much space, and there are indications that differences between the two are small. Unfortunately, it was not possible to isolate "population residing in other households on farms" (83,000) in the Ag-Pop

TABLE 2.1. Composition of Canada's Farm Population by Location, Canada and Provinces, 1971

Area	Total farm population	Population residing in census-farm holdings			Population living in farm operator households not located on census-farms
		Total	In operator households	In households other than operator households	
	1	2	3	4	5
Numerical distribution					
thousands					
Canada	1,673	1,496	1,413	83	176
Newfoundland	6	5	5	1	1
Prince Edward Island	23	21	20	2	2
Nova Scotia	28	27	24	3	1
New Brunswick	30	27	24	3	3
Quebec	356	335	314	21	21
Ontario	423	392	361	31	31
Manitoba	146	131	129	2	15
Saskatchewan	307	241	239	2	67
Alberta	267	238	229	9	30
British Columbia	86	79	69	10	7
Percentage distribution ¹					
Canada	100.0	89.4	84.5	5.0	10.6
Newfoundland	100.0	87.3	78.0	9.2	12.7
Prince Edward Island	100.0	93.3	85.3	8.0	6.7
Nova Scotia	100.0	95.1	85.2	9.8	4.9
New Brunswick	100.0	91.5	80.4	11.1	8.5
Quebec	100.0	94.1	88.2	5.8	5.9
Ontario	100.0	92.6	85.3	7.3	7.4
Manitoba	100.0	89.9	88.7	1.2	10.1
Saskatchewan	100.0	78.3	77.6	0.7	21.7
Alberta	100.0	88.9	85.5	3.5	11.1
British Columbia	100.0	92.2	80.1	12.1	7.8

¹ Percentages in this table and other tables showing percentages were calculated from unrounded figures.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Linkage, given enumeration and census processing difficulties. A large proportion of these people can probably be accounted for as hired farm labour, relatives of farm operators and unrelated households in rented dwellings.¹

As for the 176,000 non-resident farm population (Column 5), the percentage distributions in Table 2.1 indicate that this component produces the largest variation in Columns 2 and 3 in the Prairie provinces of Manitoba, Saskatchewan and Alberta. These variations are explained, in part, by differentials in type of farming. In Saskatchewan, for example, wheat farming predominates and requires less full-time surveillance than, say, livestock farming. Variations are also partly attributable to census double-counting of persons who operate a farm in one location but reside on a farm in another.

In Table 2.2, distributions of subgroups of Canada's farm population (Columns 2-4) are compared with distributions of all persons residing in each province. While Column 2 attests to a well-known distribution (i.e., major shares

See footnotes on page 77.

TABLE 2.2. Percentage Distribution of Total Population Versus Residence Categories of Farm Population, Canada and Provinces, 1971

Area	Total population	Farm population		
		Residing on census-farm	Non-residents	Persons in "other" households
	1	2	3	4
		per cent		
Canada	100.0	100.0	100.0	100.0
Newfoundland	2.4	0.3	0.4	0.6
Prince Edward Island	0.5	1.4	0.9	2.2
Nova Scotia	3.7	1.7	0.8	3.3
New Brunswick	2.9	1.7	1.4	4.0
Quebec	28.0	22.3	12.0	24.9
Ontario	35.8	25.5	17.7	36.9
Manitoba	4.6	9.2	8.4	2.0
Saskatchewan	4.3	16.9	37.9	2.4
Alberta	7.6	16.2	16.8	11.2
British Columbia	10.2	4.9	3.8	12.4

Source: Statistics Canada, 1971 Census, Vol. I.2, Table 14; and Table 2.1.

in Quebec, Ontario and the Prairies), Column 3 points to the special significance of non-resident farm population in Saskatchewan and population residing in other households on farms (83,000 in total) in Quebec and Ontario (Column 4). The fact that 62% of the population residing in other households on farms are found in Quebec and Ontario is probably attributable to the larger over-all populations of these provinces and their numerous population centres, which make farms considerably more accessible to non-agricultural households preferring to live in rural farm settings.

Table 2.3 compares provincial sex distributions of census-farm and non-resident populations versus that for urban populations. Acknowledging slight differences in urban and rural sex ratios at birth and in expectation of life, it is obvious that more females than males must be migrating out of farm areas. Of course, the smaller proportion of females to males probably reflects fewer female labour force opportunities on the farm. Farm operators are usually males (as are most hired farm workers), whereas female economic opportunities are limited largely to unpaid family work.

TABLE 2.3. Percentage Sex Distribution of Urban Population, Census-farm Population and Non-resident Farm Population, Canada and Provinces, 1971

Area	Urban population		Census-farm population		Non-resident farm population	
	Male 1	Female 2	Male 3	Female 4	Male 5	Female 6
	per cent					
Canada	49.4	50.6	53.9	46.1	53.6	46.4
Newfoundland	50.2	49.8	54.7	45.3	54.0	46.0
Prince Edward Island	47.8	52.2	54.0	46.0	52.9	47.1
Nova Scotia	49.2	50.8	54.5	45.5	51.8	48.2
New Brunswick	49.2	50.8	53.3	46.7	50.8	49.2
Quebec	49.1	50.9	53.5	46.5	50.4	49.6
Ontario	49.4	50.6	53.4	46.6	52.2	47.8
Manitoba	49.1	50.9	54.0	46.0	53.6	46.4
Saskatchewan	49.0	51.0	54.5	45.5	55.2	44.8
Alberta	50.0	50.0	54.4	45.6	54.1	45.9
British Columbia	49.7	50.3	53.0	47.0	53.3	46.7

Source: Statistics Canada, 1971 Census, Vol. I.1, Table 10; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Admittedly, female activity rates have risen considerably in Canada's farm sector over the last few decades.² However, this seems attributable more to increased involvement in unpaid or marginally paid family labour than to full-time

See footnotes on page 77.

paid farm work. Even when wives play a larger role in the operation of census-farms, there are indications that they are taking the place of hired labour (which is no longer required on a full-time basis), or are freeing their husbands for off-farm work. To illustrate, the average income of approximately 4,500 wives classified as "operator of the census-farm" (14,500 female operators in total) is about 20% of the average income of their husbands and only 25% of the average income of male household heads classified as "operator".

Chart 2.1 also relates to off-farm migration, indicating disproportionately smaller shares of census-farm males and females in the 25 - 44 age group for Canada and the provinces of Nova Scotia, Ontario and Saskatchewan. That is, the age distribution of the total, total male or total female population of each geographical unit shows larger shares of 25 - 44 - year olds than for the census-farm counterpart; this implies either much higher death rates in farm areas for these ages, very different birth rates at the time of their birth or loss due to out-migration. As we know, the first two possibilities do not describe the facts, we infer the loss was due to migration. Actually, the trend of migration in the ages 25 - 44 and 65 and over is well known to students of migration; higher migratory behaviour in these age groups has been experienced by almost all societies regardless of the economic activity of their participants (see Shaw, 1975a).

Note also, the smaller share of census-farm females than males aged 15 - 24 (the period when females would first qualify for paid full-time employment but would likely find opportunities limited in farm areas), as well as among those aged 65 and over. (By "census-farm males and females", bear in mind that we refer only to members of farm operator households located on farms.) In the latter case, longer female longevity, coupled with the burdens of having to assume responsibility for operating farms at time of the husband's death, are likely to result in liquidation of assets and retirement migration to non-farm areas where amenities are more abundant and centralized.

As for ethnic origin, it comes as little surprise that the British (41.1%) and the French (20.3%) dominate. Of the balance, German (13.9%), Ukrainian (6.9%), Scandinavian (4.5%), Netherland (4.3%), and Polish (2.6%) origins stand out. In comparison with Canada as a whole, British and French origins are slightly underrepresented among Canada's census-farm population (about 5% less in each case), whereas the other groups mentioned are two to three times more prevalent in the farm sector.

2.3. Family Structure

Of Canada's 326,000 farm operators residing on farms (of approximately 366,000 in total), about 93% are members of families. Approximately 96% of these families (hereafter, census-farm families) are headed by males, compared with 93% for all Canadian families. Table 2.4, Parts A and B, further classifies these census-farm family heads by four broad age categories revealing, again, the

TABLE 2.4. Comparison of Number and Age Distribution of All Family Heads with Census-farm Family Heads, Canada and Provinces, 1971

No.	Area	Total families 1	Percentage of families with male heads 2	Age of family head	
				Total 3	15 - 24 years 4
		Part A - Census-farm families			
		000's	per cent		
1	Canada	304	96.8	100.0	1.9
2	Newfoundland	1	95.9	100.0	4.1
3	Prince Edward Island	4	94.2	100.0	2.8
4	Nova Scotia	5	95.1	100.0	1.9
5	New Brunswick	5	96.2	100.0	2.7
6	Quebec	56	96.9	100.0	1.5
7	Ontario	82	96.9	100.0	1.9
8	Manitoba	29	96.6	100.0	2.2
9	Saskatchewan	55	96.6	100.0	2.0
10	Alberta	51	97.0	100.0	2.0
11	British Columbia.	16	97.1	100.0	1.4
		Part B - All census families			
		000's	per cent		
12	Canada	5,076	92.5	100.0	6.4
13	Newfoundland	108	93.2	100.0	8.1
14	Prince Edward Island	24	92.0	100.0	6.7
15	Nova Scotia	182	91.7	100.0	7.1
16	New Brunswick	141	92.3	100.0	7.6
17	Quebec	1,357	92.0	100.0	5.2
18	Ontario	1,884	92.9	100.0	6.6
19	Manitoba	236	92.4	100.0	6.7
20	Saskatchewan	216	93.2	100.0	6.0
21	Alberta	383	92.8	100.0	7.6
22	British Columbia.	535	92.6	100.0	6.4

Source: Statistics Canada, 1971 Census, Vol. II.2, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

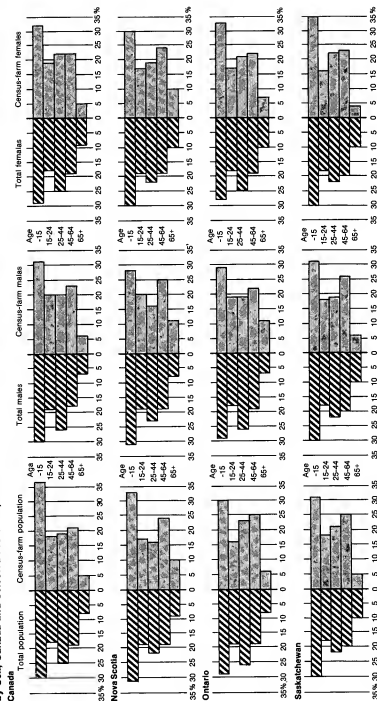
TABLE 2.4. Comparison of Number and Age Distribution of All Family Heads with Census-farm Family Heads, Canada and Provinces, 1971

Age of family head			Average family size	Percentage of families with six or more members	No.
25-44 years 5	45-64 years 6	65 years and over 7			
Part A - Census-farm families					
per cent					
35.8	49.9	12.5	4.5	24.9	1
28.0	53.4	14.0	4.8	31.6	2
31.3	46.8	19.3	4.7	29.1	3
26.2	51.3	19.4	4.3	22.6	4
27.0	53.9	16.4	4.7	29.9	5
36.7	50.8	11.0	5.2	41.5	6
36.2	48.5	13.4	4.3	21.5	7
33.9	51.3	12.5	4.3	20.7	8
34.2	51.9	11.9	4.2	19.1	9
38.6	47.8	11.7	4.4	22.3	10
37.7	50.0	11.3	4.4	21.9	11
Part B - All census families					
per cent					
46.2	35.7	11.8	3.7	14.1	12
45.4	35.0	11.6	4.4	25.4	13
39.5	36.4	17.4	4.0	20.6	14
42.3	36.9	13.6	3.8	16.2	15
42.0	36.6	13.8	4.0	19.8	16
48.4	35.6	10.7	3.9	16.9	17
46.6	35.6	11.1	3.6	11.5	18
42.0	36.8	14.4	3.6	13.1	19
39.5	38.1	16.3	3.7	15.4	20
48.2	33.2	11.0	3.7	14.2	21
45.1	35.8	12.7	3.5	10.6	22

Source: Statistics Canada, 1971 Census, Vol. II.2, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 2.1

Comparison of Total Population Versus Census-farm Population, Age Distributions by Sex, Canada and Selected Provinces, 1971



Sources: Statistics Canada, 1971 Census, Vol. 1, 2, Table 7, and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

considerably older age profile of census-farm versus all family heads. A notable difference emerging from Table 2.4, Part A is that, among these family heads, larger proportions of younger heads are found in Ontario, British Columbia, Quebec and Alberta. As we shall see, a reason for this is that these are the most economically prosperous census-farm areas, particularly with respect to the role that off-farm income plays in supplementing farm incomes. This is one reason why emigration from these areas (i.e., reduction in the proportion of households with young heads) is less than in others (e.g., the Maritime provinces).

We also note in comparing Table 2.4, Parts A and B, Columns 8 and 9, that average family size of the census-farm population group is generally larger than that of all families. The same applies for proportions of census-farm families with six or more members. Explanation of the latter differential is relatively straightforward; it derives from the socio-economic theory of fertility, with its emphasis on lower costs of providing for children in farm versus urban areas,

TABLE 2.5. Family Membership of Census-farm Operators and Population Aged 15 and Over, Canada and Provinces, 1971

Area	Census-farm population		Census-farm operators	
	Total	Percentage in family households	Total	Percentage in family households
	1	2	3	4
	000's		000's	
Canada	949	91.4	366	90.2
Newfoundland	3	92.4	1	92.3
Prince Edward Island	13	88.1	5	88.6
Nova Scotia	17	86.9	6	88.7
New Brunswick	17	88.6	5	90.9
Quebec	203	92.5	61	93.2
Ontario	249	91.4	95	91.2
Manitoba	88	91.1	35	89.0
Saskatchewan	162	91.1	77	88.5
Alberta	151	91.3	63	88.6
British Columbia	46	92.0	18	91.0

Source: Statistics Canada, 1971 Census, Vol. IV.1, Table 2; and 1971 Census unpublished tabulation drawn from the Agriculture-Population Linkage.

benefits to be had from children engaging in family production in self-employment farm settings as against largely wage and salary urban settings, etc. (For explication of the theory and evidence see Shaw, 1974.)

As for membership in census-defined families (see Appendix A.5, Glossary of Terms), 91% of census-farm persons aged 15 and over belong to census-farm families (see Table 2.5, Column 2). Similarly, the proportion of all resident and non-resident census-farm operators belonging to family households is about 90%. In both cases, variations between provinces are slight, indicating a relatively constant structure.

2.4. Mobility Characteristics

A rapid rate of emigration has characterized Canada's farm sector over the last several decades. (See footnote 5, Chapter 1.) While the absolute number of emigrants has declined substantially (implying lower absolute and relative absorption requirements in non-farm areas), the rate of out-migration from farm areas has actually increased.

Table 2.6, Column 1, conveys orders of magnitude of decline of total farm population (i.e., sum of the three farm components) via a ratio of 1971 to 1961 total farm population; again, the higher rates of decline are evident in the less prosperous farming areas of the Maritime provinces and Quebec. Had our calculations been more rigorous, and taken into consideration differentials in fertility between provinces, the rates for the Maritimes and Quebec would be even larger.

Unfortunately, means of evaluating the *who's* and *why's* of farm emigration using census data are limited. While persons who left rural areas five years ago can be identified (re: place of residence in 1971), and while the extent to which their area of origin was a farm area can be ascertained, there is no way of knowing whether the rural emigrants used to reside on farms *per se*. Nor is there any way of ascertaining the characteristics of the farm left behind. Even if farm emigrants could be identified, attempts to calculate costs and benefits to emigration would be fruitless because farmers are "self-employed" and the nature of their incomes, amenities and capital stock is (i) poorly understood, (ii) difficult to measure, and (iii) largely incomparable with urban wages and salaries. This means that analysis of off-farm migration is limited to cross-sectional evaluation of rates of out-migration as a function of characteristics of the place of origin. While this kind of analysis has been performed using cross-section regression, results are reserved for Chapter 5, Section 5.4.

Of course, not all farm migration is off-farm. According to Table 2.7, Column 1, some 127,000 or 9.7% of Canada's total farm population (sum of three subgroups) migrated to or within Canada's farm sector. Over-all, Ontario and British Columbia are the major recipients of interprovincial migrants. Unlike the

TABLE 2.6. Select Immigration¹ and Residence Characteristics of Census-farm Operators, Canada and Provinces, 1971

Area	Ratio of 1971 farm population to 1961 farm population	Census-farm operators			
		Immigrants	Immigrated between 1961 - 71		
	1	2	3		
		per cent			
Canada	0.70	15.6	0.7		
Newfoundland.	0.46	1.4	0.0		
Prince Edward Island	0.61	4.1	0.3		
Nova Scotia	0.46	7.0	0.7		
New Brunswick	0.43	5.4	0.8		
Quebec.	0.57	2.3	0.3		
Ontario.	0.75	19.4	1.2		
Manitoba.	0.76	11.7	0.2		
Saskatchewan	0.76	14.4	0.1		
Alberta	0.83	22.6	0.4		
British Columbia	0.94	40.4	4.2		
	Census-farm household heads		Operators residing on farm less than nine months	Non- resident census- farm operators	Farm operators residing in urban areas ²
	Immi- grants	Immi- grated between 1961 - 71			
	4	5	6	7	8
	per cent				
Canada	22.3	4.9	14.8	11.0	6.4
Newfoundland.	2.7	1.0	13.6	11.8	14.9
Prince Edward Island	4.9	0.8	5.7	4.2	1.8
Nova Scotia	6.9	1.5	4.6	3.1	3.6
New Brunswick	5.2	0.9	5.4	3.6	7.2
Quebec.	11.6	3.7	5.2	3.3	9.4
Ontario.	30.8	7.2	8.3	6.0	8.1
Manitoba.	22.4	3.3	16.0	13.0	3.2
Saskatchewan	18.8	1.3	30.7	24.1	5.8
Alberta	26.7	3.9	17.7	12.1	4.2
British Columbia	32.1	5.7	10.9	5.5	10.0

¹ "Immigration" means migration to Canada from another country.

² Operators who reported their occupation as farming during census week.

Source: Statistics Canada, 1971 Census, Vol. III.1, Table 3 A and Vol. IV, Table 2; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

1944 - 60 period, immigrants to Canada's farm sector play a very small role (only 0.7% of Canada's 1971 total census-farm operators; see Table 2.6, Columns 2 and 3), whereas migration from a different province is the major external influence on additions to or shifts in geographic location of farm population (Table 2.7, Column 5). That British Columbia and Ontario exhibit greatest mobility of farm population is unusual only in that most of the operator additions represent location on small marginal farms. As for incidence of movement, approximately 60% of all persons moving moved only once, 20% twice and 20% three or more times. These ratios are relatively constant across provinces. The age profiles of the movers are, as would be expected, weighted more to those in the younger ages.

TABLE 2.7. An Account of Migration Within and to Census-farm Areas, Canada and Provinces, 1971

Area	Census-farm population aged five and over who changed residence between 1966 - 71						
	Number	Percentage of all census-farm population aged five and over	Percentage distribution of migrants				
			Total	From same province	From different province	From outside Canada	Province of residence in 1966 not stated
	1	2	3	4	5	6	7
	000's						
Canada	127.4	9.7	100.0	74.9	11.8	7.3	6.0
Newfoundland	0.3	6.2	100.0	69.0	19.0	5.2	6.9
Prince Edward Island	1.1	5.9	100.0	54.8	28.1	7.5	9.2
Nova Scotia	2.0	7.9	100.0	57.1	26.5	9.8	6.6
New Brunswick	1.5	6.4	100.0	59.7	18.4	13.4	8.9
Quebec	15.0	5.2	100.0	83.8	3.1	4.7	8.4
Ontario	44.9	13.3	100.0	81.5	5.8	7.3	5.4
Manitoba	9.2	7.7	100.0	74.2	16.0	3.8	6.1
Saskatchewan	14.2	6.6	100.0	73.0	18.5	2.8	5.6
Alberta	22.5	10.4	100.0	71.9	16.0	6.7	5.4
British Columbia	16.6	24.3	100.0	60.5	18.0	15.5	6.0

Source: Statistics Canada, 1971 Census, Vol. 1.2, Table 29.

Immigration is contributing less to the growth of Canada's census-farm population every year. This is easy to understand in view of the fact that characteristics of labour force-age immigrants to Canada are required to be compatible with and desirable for Canada's occupational-industrial structure and needs (see Shaw, *et al.*, 1973). Therefore, given the already existing exodus from farm areas, smaller and smaller shares of farmers are perceived as desirable. That British Columbia exhibits disproportionate attraction for immigrants to farm areas is probably due to the fact that residence on census-farms in this province usually means residence on small-scale farms, with more involvement in non-agricultural economic activity than in farming.

An additional dimension of off-farm mobility is the slow transition to non-farm living, often involving residence on farms for only part of the year (see Table 2.6, Columns 6 - 8) or residence in urban areas. In these cases, farm operators are often straddling farm/non-farm occupational involvement.

2.5. Educational Characteristics

Educational attainment has an important bearing on individual integration in society, access to socio-economic opportunities, and appreciation of ever-increasing complexity and specialization. Possibly the most significant aspect of educational attainment is that, in principal, it is one endowment within reach of all Canadians that is strongly and positively related to higher levels of socio-economic well-being. While other traits such as natural ability, sex, ethnic origin, age and inherited wealth also bear on differential attainment of socio-economic well-being, many are outside individual control.

With the above in mind, it comes as no surprise that the theory of human capital investment places so much emphasis on accessibility to education as a means of enhancing human factor endowments. Not only does the theory purport that education enhances the ability of workers to produce more with what they have (so-called worker effect), and to organize what they have toward producing more (so-called allocative effect), but educational systems strive to equalize the distribution of job opportunities by endowing persons with required formal credentials necessary to qualify for jobs.³

Consider the distribution of Canada's census-farm population by broad educational categories in Table 2.8. Comparing the distribution for census-farm family heads with that of all family heads reveals that Canada's census-farm population is endowed with lower levels of education than Canadians in general. Ratios of census-farm to total family heads with Grades 5 - 8, 9 - 11, 12 and 13 or with university degree, are approximately 1.6, 0.9, 0.5 and 0.2, respectively.

At least three reasons for this disequilibrium can be cited. First, with selective rural emigration favouring younger males and females, those remaining are generally older persons who completed formal education 10 - 20 years ago, when termination at lower levels of attainment was both adequate in the job market and socially condoned. This tends to weight the distribution toward the lower rungs of the educational ladder. In support of this claim, Table 2.8, Columns 7 - 11, reveals an educational distribution for resident and non-resident census-farm operators aged less than 25, and 25 - 44 that is much closer to the Canada norm than that for farm operators aged 45 and over. As farm operators aged less than 25 and 25-44 are underrepresented in the profile of all census-farm operators, it is obvious why the over-all educational profile tilts

See footnotes on page 77.

downwards. Note also in Table 2.8, Column 3, that when we consider farm family members other than the head (the heads being mainly older male farm operators), the educational profile rises.

A second reason for the lower education profile among census-farm persons aged 15 and over may be that higher education does not produce commensurate

TABLE 2.8. Percentage Distribution by Educational Attainment of Census-farm Family Heads, Other Family Members and Non-family Members Aged 15 and Over, and Farm Operators by Age, Canada, 1971

Education level	Census family heads		Census-farm family members other than head	Census-farm non-family members	Census-farm persons aged 15 and over in families	
	Total 1	Census-farm 2			Male 5	Female 6
Number 000's	5,076	304	563	74	465	403
Percentage distribution by level of education						
Less than Grade 5	7.0	8.7	3.4	17.0	6.1	4.0
Grades 5-8	32.4	51.2	27.9	48.1	39.8	31.8
Grades 9-11	31.6	28.3	41.8	23.1	35.9	38.7
Grades 12 and 13	16.2	8.1	20.6	8.0	13.1	19.9
Some university	5.6	2.5	5.2	2.4	3.9	4.7
University degree	7.2	1.2	1.1	1.4	1.3	0.9
Age of census-farm operators						
	Total	Less than 25 years	25-44 years	45-64 years	65 years and over	
	7	8	9	10	11	
Number 000's	366	9	131	184	43	
Percentage distribution by level of education						
Less than Grade 5	9.6	1.5	2.3	9.6	21.9	
Grades 5-8	50.2	19.8	42.7	55.7	55.2	
Grades 9-11	28.6	39.4	36.6	25.5	15.2	
Grades 12 and 13	8.8	28.3	12.6	6.1	4.8	
Some university	2.7	8.3	3.7	1.9	2.0	
University degree	1.4	2.5	2.0	1.1	0.9	

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

benefits in farming. That is, a certain level of education (e.g., high-school graduation) is not necessary to qualify for a farm occupation, nor are there obvious returns accruing from a largely formal or classical education. In other words, pursuit of education may mean delayed earnings for those who have decided on a farming career, without any compensating increase in income.

A third reason has to do with motivation to pursue higher levels of education. Families and peer groups in census-farm areas may demonstrate neither the need nor the esteem for higher education to the same extent as their urban counterparts. On the one hand, the demonstration effect of a family head with a high level of education will be less in farm than non-farm areas. On the other hand, if higher education is perceived by parents as a process of implanting aspirations that can only be achieved in non-farm settings, we might imagine some parental reluctance to support that process, if it means eventual geographical separation from their children.

Table 2.9, Columns 1 and 2, further demonstrates the gap between level of educational attainment for all households as against households resident on census-farms for Canada and the provinces. Differences between provinces in proportions attaining less than Grade 9 education (particularly with increasing age; see Columns 6 and 7) underlie some of the difficulties being encountered in programs to reallocate poorly educated farmers from less prosperous farm regions to non-farm regions (particularly in Newfoundland, New Brunswick and Quebec). Problems of reallocating farm operators from one province to another can also be anticipated as discrepancies between farm/non-farm education are often larger between provinces than within provinces. All this is to say that notable differences in educational attainment between regions in Canada cannot help but impede the free transfer of resources to places which policy-makers deem desirable. Without policy intervention, the market mechanism may operate to keep poorly educated farmers, who like to relocate, largely immobile because their present location may truly represent their place of best competitive advantage, given their limited human factor endowments.

Although we can generalize that formal education is likely to have less applied value in qualifying for or performing a farm versus non-farm occupation, the same does not apply for vocational training. Surprisingly, Table 2.10 reveals that a larger share of all census-farm operators (resident and non-resident) have taken non-agricultural vocational courses than agricultural vocational courses. One reason may be that non-agricultural vocational courses are more abundant and evenly available throughout Canada, due to a greater demand associated with needs of a largely non-agricultural industrial society. Another reason may be that most farmers have done without and feel they can do without agricultural vocational courses, whereas if they have a low level of educational attainment but seek non-agricultural employment, non-agricultural vocational courses may be perceived as a minimum prerequisite to securing off-farm jobs. As we shall see later, vocational training is associated with higher off-farm employment income but not with net farm self-employment income.

TABLE 2.9. Percentage of Census-farm Household Heads with Less Than Grade 9 Education by Age, Compared with that of All Household Heads with Less Than Grade 9 Education, Canada and Provinces, 1971

Area	Percentage with less than Grade 9 education			
	All household heads	Total census-farm operators	Age of census-farm family heads	
			Total	15 - 24 years
	1	2	3	4
	per cent			
Canada	39.4	58.4	60.0	25.4
Newfoundland.	53.4	67.9	66.3	37.5
Prince Edward Island.	46.4	56.8	58.2	60.9
Nova Scotia	38.5	41.7	42.3	40.0
New Brunswick	52.1	69.6	70.6	33.3
Quebec	50.2	79.3	80.4	48.0
Ontario	34.3	56.7	57.5	21.6
Manitoba	38.9	61.1	63.1	30.2
Saskatchewan	44.7	55.5	57.4	21.8
Alberta	30.2	47.5	48.5	11.2
British Columbia	28.0	44.2	43.6	11.6
	Age of census-farm family heads			Census-farm non-family members aged 15 and over
	25 - 44 years	45 - 64 years	65 years and over	
	5	6	7	8
	per cent			
Canada	46.4	66.3	79.2	64.4
Newfoundland.	50.0	72.8	85.1	67.4
Prince Edward Island.	43.4	63.7	73.0	66.1
Nova Scotia	31.8	42.4	56.2	53.8
New Brunswick	54.7	78.1	78.2	71.0
Quebec	70.0	86.8	90.4	73.9
Ontario	44.5	62.4	79.7	63.0
Manitoba	49.7	69.3	79.7	69.7
Saskatchewan	41.7	63.6	81.8	65.4
Alberta	32.4	56.7	74.0	56.6
British Columbia	32.5	49.0	60.7	49.3

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

TABLE 2.10. Percentage of Census-farm Operators with Vocational Training by Type of Training, Canada and Provinces, 1971

Area	Total census-farm operators	Percentage with agricultural vocational training	Percentage with non-agricultural vocational training		
			Total	Appren- ticeship	Other
	1	2	3	4	5
	000's				
Canada	366	2.0	6.9	4.0	2.9
Newfoundland	1	0.5	5.2	1.9	3.3
Prince Edward Island	5	1.0	5.4	3.0	2.4
Nova Scotia	6	0.8	6.5	3.3	3.2
New Brunswick	6	1.6	5.9	3.5	2.4
Quebec	62	4.2	4.6	2.7	1.9
Ontario	94	1.6	7.4	4.5	2.9
Manitoba	35	1.7	5.5	3.1	2.4
Saskatchewan	77	0.8	5.7	3.1	2.6
Alberta	62	9.7	30.4	17.4	13.0
British Columbia	18	1.4	14.3	8.1	6.1

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

2.6. Occupational and Industrial Characteristics

Of Canada's total population aged 15 and over (age 15 being the minimum age of entry to the labour force), approximately 63% worked some or all of 1970 as against approximately 70% for Canada's census-farm population aged 15 and over (see Table 2.11, Columns 2 and 4).⁴ The reason for higher labour force participation among census-farm population is twofold. First, farming is a self-employment industry, where absorption capacity is almost unlimited — at least superficially. Of course, this says nothing about underemployment. It also overlooks the fact that self-employment farming employs seasonal labour, much of it unpaid family labour. Thus, the propensity for more people to work at least part of the year exists. In contrast, most of Canada's non-farm occupations are wage and salary occupations where working during the year usually implies full employment of most persons, coupled with overt unemployment of others, and few opportunities for unpaid family work.

See footnotes on page 77.

TABLE 2.11. Worker and Income Status of Total Population and Census-farm Population Aged 15 and Over, Canada and Provinces, 1971

Area	Total population aged 15 and over		Census-farm population aged 15 and over	
	With 1970 income	Who worked in 1970	With 1970 income	Who worked in 1970
	1	2	3	4
	per cent			
Canada	76.2	63.1	66.2	70.8
Newfoundland	67.7	51.4	62.7	55.5
Prince Edward Island	78.3	64.1	73.7	71.7
Nova Scotia	74.3	58.5	70.4	65.0
New Brunswick	73.0	58.8	64.9	61.1
Quebec	71.2	58.2	58.2	59.4
Ontario	79.5	66.9	71.9	75.4
Manitoba	78.5	65.4	65.8	73.0
Saskatchewan	75.7	63.5	65.7	73.2
Alberta	77.9	68.0	65.8	75.6
British Columbia	79.2	63.6	71.6	75.2

Source: Statistics Canada, 1971 Census, Catalogue 94-789 (AE-5, 1974), Tables 1 and 2; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Differentials in the proportion of census-farm population working will also be affected by provincial demand for labour in off-farm occupations, which in turn will largely be a function of prosperity of the region's economy. As will be illustrated later, there is a strong correlation between both the provincial level of labour force participation and provincial population receiving income, and the economic prosperity of the provincial economy as a whole.

It is also significant that the proportion of census-farm population with income is consistently lower than that for the total population of each area. A major reason is that a large proportion of farm operators have reported zero farm income or losses. With respect to the Prairies, this is because 1970 was a bad year for crop farmers (1970 being the year for which net farm income is reported). It also reflects the fact that farmers typically plough profits back into their capital stock (i.e., accumulated wealth), and use their farms as a convenient tax write-off. These problems will be discussed fully later.

Table 2.12, Columns 1 and 3, reveals that approximately 30% of resident census-farm persons aged 15 and over, and 25% of resident census-farm family

heads (mostly male farm operators) were employed in non-agricultural industries during census week. The significance of this finding should not be minimized on the grounds that the reference period is only one week: The objective in Canada's decennial census is to provide a snapshot of goings-on in the country during census week, a supposedly representative time during the entire year. In evaluating results of the census, census week (in June) is a good time for enumerating farm activity because farming is in full swing during early summer. Accordingly, we would expect those who are really involved in farming as a source of livelihood to be engaged in farming occupations (as measured by the census) at that time.

TABLE 2.12. Percentage of Census-farm Population Aged 15 and Over by Family Status and by Industry, Canada, 1971

Item	Census-farm population aged 15 and over	Family members of census-farm households			Not in families
		Total	Family heads	Other than heads	
	1	2	3	4	5
Number 000's	949	867	304	563	82
Percentage worked in 1970	70.8	70.9	96.4	57.1	70.1
Percentage in agricultural industries	62.5	62.3	67.5	57.6	64.0
Percentage in non-agricultural industries	30.5	31.5	25.3	37.1	20.8
Percentage not stated	7.0	6.2	7.2	5.2	15.2

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Whereas Table 2.12 pertains largely to census-farm family heads (i.e., male farm operators), Table 2.13 profiles the labour force status and industrial involvement of non-operator census-farm persons aged 15 and over. Of approximately 949,000 census-farm persons aged 15 and over, approximately 672,000 or 71% worked in 1970, and 68% were classified as being in the labour force during census week. Of these 646,000, approximately 50% operated farms and 50% were other census-farm persons aged 15 and over. Of the latter group, a little over half were in the agricultural labour force (mostly as unpaid family labour). Most of the rest were wage and salary earners in the non-agricultural labour force.

As mentioned previously, unpaid family labour is rare in the non-agricultural labour force (see Table 2.13, Column 12). Note also that, for provincial distributions of census-farm labour force persons aged 15 and over in agricultural versus non-agricultural labour force, the more prosperous the farm area, the larger the agricultural share. To illustrate, Newfoundland's low labour force rate for farm operators (74%, see Column 5), indicating lack of opportunities on farms, ties in well with the accompanying distribution of only 16% of the province's remaining farm population in unpaid family work versus 64% in wage and salary work. For the Prairie provinces, just the opposite is true.

TABLE 2.13. Census-farm Population Aged 15 and Over by Labour Force Status, Canada and Provinces, 1971

Area	Census-farm population aged 15 and over			Resident census-farm operators		
	Total	Who worked in 1970	In labour force	Total	Percentage in labour force	
	1	2	3	4	5	
	000's					
Canada	949	672	646	323	89.1	
Newfoundland.	3	2	2	1	74.4	
Prince Edward Island	13	10	9	4	89.0	
Nova Scotia	17	11	11	6	87.0	
New Brunswick	17	10	10	5	86.3	
Quebec	203	120	119	57	81.1	
Ontario	249	187	178	87	91.1	
Manitoba	88	64	61	31	89.9	
Saskatchewan	162	119	113	59	91.3	
Alberta	151	114	110	55	91.3	
British Columbia	46	35	33	17	90.6	
Persons aged 15 and over, other than census-farm operators, in labour force						
Agricultural labour force				Non-agricultural labour force		
Total	Percentage of total	Percentage with wages and salaries ¹	Percentage of unpaid family workers ¹	Percentage of total	Percentage with wages and salaries ¹	Percentage of unpaid family workers ¹
6	7	8	9	10	11	12
000's						
Canada	323	55.1	14.0	34.3	44.9	40.7
Newfoundland.	1	26.4	7.5	16.4	73.6	64.1
Prince Edward Island	5	42.7	10.9	28.9	57.3	57.9
Nova Scotia	5	35.8	11.1	22.4	64.1	59.8
New Brunswick	5	36.2	9.2	25.0	63.8	59.3
Quebec	62	45.2	8.7	33.7	54.8	49.6
Ontario	92	48.7	13.1	31.0	51.4	47.5
Manitoba	30	63.9	16.1	37.8	36.1	32.4
Saskatchewan	53	64.8	17.3	34.8	35.2	21.8
Alberta	54	64.0	16.8	39.1	36.0	32.0
British Columbia	16	42.9	12.9	27.0	57.1	51.5

¹ Columns 8 and 9, 11 and 12 do not add to 100% as there is an "other" category plus a "not stated" category.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Table 2.14 further distributes census-farm persons aged 15 and over who worked in 1970 according to their participation in non-agricultural industries. Column 3 provides a clear indication that a surprising proportion of the census-farm population "work force" is engaged in non-agricultural industries in all provinces but the Prairies. As in most countries experiencing a labour force shift from agricultural to non-agricultural occupations, the largest proportion of those in non-agricultural work are classified in the trade, commerce, services categories, etc.

TABLE 2.14. Percentage of Census-farm Population Aged 15 and Over by Labour Force and Industrial Status, Canada and Provinces, 1971

Area	Total census-farm population aged 15 and over	Census-farm population who worked in 1970		
		Total	Percentage in farm industry	Percentage in non-agricultural manufacturing
	1	2	3	4
	000's			
Canada	949	672	62.3	30.5
Newfoundland	3	2	29.9	57.3
Prince Edward Island	13	10	51.7	38.7
Nova Scotia	17	11	41.8	49.0
New Brunswick	17	10	43.1	47.0
Quebec	203	120	52.9	35.7
Ontario	249	187	55.5	37.5
Manitoba	88	64	70.9	24.0
Saskatchewan	162	119	80.4	15.4
Alberta	151	114	70.6	24.0
British Columbia	46	35	43.8	45.9
	Census-farm population who worked in 1970			
	Percentage in construction, transportation, communication and other utilities	Percentage in trade, business, personal services, public administration and defence	Percentage not stated	Percentage in other industries
	5	6	7	8
Canada	6.5	6.4	15.9	7.0
Newfoundland	6.1	17.4	27.3	12.8
Prince Edward Island	5.8	7.7	22.5	9.4
Nova Scotia	7.4	12.2	24.6	9.0
New Brunswick	9.8	9.0	22.9	9.7
Quebec	10.6	6.8	15.2	11.3
Ontario	9.9	7.3	19.7	6.7
Manitoba	3.7	5.9	13.4	4.9
Saskatchewan	1.2	3.3	9.9	4.1
Alberta	5.3	5.6	13.8	2.5
British Columbia	8.9	9.9	22.9	9.9

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from Agriculture-Population Linkage.

Considering only census-farm operators (resident and non-resident), Table 2.15 also conveys that, during census week, relatively large proportions of farmers were involved in occupations other than farming (Columns 1 and 2) and that relatively large proportions of operators earn off-farm employment income, especially wages and salaries. Here is a clear indication that classification of populations according to the presence of a census-farm operator runs the risk of creating false impressions about that share of Canada's population that is really tied to the land. Unless this phenomenon represents a "position of entry into agriculture", or a "position of long-term stability", reliance on off-farm

occupations and employment income may be indicative of "persons on their way out of agriculture". If the latter is the case, it may be that our entire concept of farming requires modification.

TABLE 2.15. Indicators of Census-farm Operator Involvement in Off-farm Occupations and Work, Canada and Provinces, 1971

Area	Percentage of census-farm operators classified as self-employed agricultural workers during census week 1	Percentage of census-farm operators reporting farm occupation during census week 2	Percentage of census-farm operators reporting off-farm employment income 3	Percentage of census-farm operators reporting wages and salary 4
Canada	55.7	64.9	46.3	37.8
Newfoundland	26.0	34.4	71.3	55.7
Prince Edward Island	54.0	60.6	47.7	37.0
Nova Scotia	38.2	46.0	63.9	52.5
New Brunswick	40.5	47.3	60.6	50.5
Quebec	51.3	59.9	47.6	38.7
Ontario	49.2	57.2	53.0	45.0
Manitoba	63.3	73.3	40.3	32.0
Saskatchewan	69.1	79.3	34.0	26.2
Alberta	60.2	70.9	43.7	35.3
British Columbia	31.4	39.0	67.6	58.2

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

2.7. General Levels and Structure of Incomes

2.7.1. Introduction

Without doubt, the most important topic in this inquiry concerns level, structure and source of cash income of Canada's census-farm population. Economically, cash income means the ability to purchase goods and services produced for consumption as well as to save and invest in the production process. Sociologically, cash income means opportunities to be fully integrated in a society where most transactions are monetary. This section discusses numerous dimensions of this most important topic including the fact that cash income represents only a partial measure of levels of living.⁵

Table 2.16 provides summary data on numbers of income earners. Note that approximately 30% of Canada's farm operators report zero or loss in farm income (Column 5 minus Column 6). Although this portion increases in the poorer farm

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provinces, it is also large in the wealthy provinces of Ontario and British Columbia. As we shall see in later chapters, there are numerous clues that marginal farms, tax write-offs, etc., may be partly to blame for such high figures.

TABLE 2.16. Total Census-farm Population, Census-farm Population Aged 15 and Over Who Worked in 1970 and Reported Income, Total Census-farm Operators and Operators with Positive Farm Income, Canada and Provinces, 1971

Area	Total census-farm population	Census-farm population aged 15 and over			Census-farm operators	
		Total	Worked in 1970	Reporting income	Total	Reporting income
	1	2	3	4	5	6
thousands						
Canada	1,413	949	672	628	366	230
Newfoundland.	5	3	2	2	1	1
Prince Edward Island.	20	13	10	10	5	3
Nova Scotia	24	17	11	12	6	3
New Brunswick	24	17	10	11	6	3
Quebec.	314	203	120	118	62	42
Ontario.	361	249	187	179	95	55
Manitoba.	129	88	64	58	35	23
Saskatchewan	239	162	119	107	77	54
Alberta.	229	151	114	99	63	39
British Columbia	69	46	35	33	18	8

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Table 2.17 compares the sex distribution of census-farm income recipients aged 15 and over with that of all persons 15 and over. As development economists will know opportunities for earning income are much lower for census-farm females (Part A, Columns 5 and 6), than for their counterparts in the total population (Part B, Columns 5 and 6). This fact marries well with our hypothesis that the dip in the age distribution of census-farm females between ages 15 - 24 (see Section 2.1) is tied to fewer economic opportunities. This is apparent in comparing the census-farm male-to-female average income ratio with that for Canada's total male-to-female ratio (Table 2.17, Parts A and B, Column 7). Of added importance is that provinces with low (high) male-to-female income ratios for the total population have low (high) farm population male-to-female income ratios; in fact the correlation coefficient is $r = 0.62$. Again, this suggests that an important factor in levels of farm income may be the level of income generated in the regional or provincial economy as a whole. It certainly bears on the important question of whether and to what extent regional economic prosperity governs returns to farming.

TABLE 2.17. Sex Distribution of Total and Census-farm Population and Income Recipients Aged 15 and Over, and Ratio of Male-to-female Average Total Income, Canada and Provinces, 1971

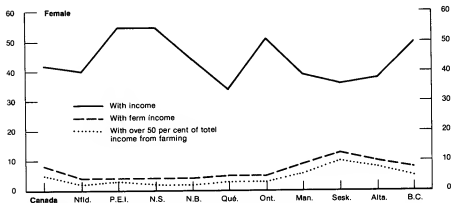
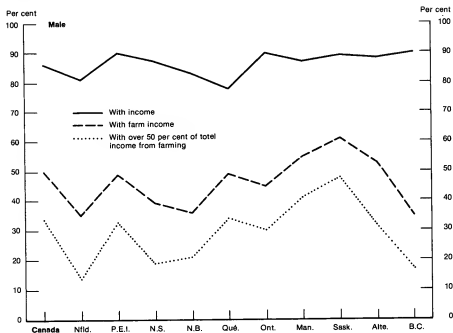
Area	Population aged 15 and over			Income recipients			Ratio male-to-female average income
	Number	Percentage		Number	Percentage		
		Male	Female		Male	Female	
1	2	3	4	5	6	7	
Part A - Census-farm population							
	000's			000's			
Canada	949	55.0	45.0	628	71.8	28.2	2.06
Newfoundland.	3	54.6	45.4	2	71.2	28.8	2.23
Prince Edward Island.	13	54.8	45.3	10	66.4	33.6	1.82
Nova Scotia	17	55.0	45.0	12	68.4	31.6	1.91
New Brunswick	17	53.8	46.2	11	68.9	31.1	2.00
Quebec	203	54.6	45.4	118	73.3	26.7	1.88
Ontario	249	54.2	45.8	179	67.7	32.3	2.24
Manitoba.	88	55.7	44.3	58	73.7	26.3	1.88
Saskatchewan	162	56.0	43.9	107	76.0	24.0	1.96
Alberta	151	55.8	44.2	99	74.5	25.5	2.08
British Columbia	46	53.8	46.2	33	67.7	32.3	2.80
Part B - Total population							
	000's			000's			
Canada	15,190	49.6	50.4	11,573	58.8	41.2	2.27
Newfoundland.	328	50.9	49.1	222	64.7	35.3	2.43
Prince Edward Island.	76	50.2	49.8	60	58.7	41.3	2.02
Nova Scotia	548	49.9	50.1	407	60.2	39.8	2.22
New Brunswick	431	49.9	50.1	315	60.3	39.7	2.21
Quebec	4,242	49.1	50.9	3,020	60.2	39.8	2.12
Ontario	5,496	49.4	50.6	4,370	57.1	42.9	2.35
Manitoba.	701	49.8	50.2	551	58.0	42.0	2.27
Saskatchewan	646	50.8	49.2	489	61.0	39.0	2.08
Alberta	1,113	50.7	49.3	868	59.7	40.3	2.35
British Columbia	1,575	50.2	49.8	1,247	58.5	41.5	2.45

Source: Statistics Canada, 1971 Census, Vol. III.1, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Again, basic counts and distributions of total population and census-farm population are provided for Canada and the provinces in Table 2.18. The interesting comparison here is with the distribution of population (Part A) versus the distribution of earned income (Part B). As far as total population distribution and total earned income is concerned (Part A, Column 1 and Part B, Column 1), Ontario, Quebec and British Columbia fare best. This trend also applies in most cases when it comes to distribution of census-farm population and their total earned income (Part A, Column 5, and Part B, Column 2). However, when we consider distributions of income earned from farming by census-farm persons aged 15 and over (Part A, Column 6 and Part B, Column 3), the Prairie provinces fare best whereas, considering only the distributions for farm operators (Part A, Column 7 and Part B, Column 5), the distribution is more equitable, except, of course, for the Maritime provinces which are always on the losing side.

Chart 2.2

Percentage of Census-farm Male and Female Population Aged 15 and Over, with Income, with Farm Income and with Over 50 Per Cent of Total Income Derived from Farming, Canada and the Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

The importance of farming as a source of income for both census-farm males and females is conveyed in Chart 2.2. For example, of all census-farm male persons aged 15 and over who earn income (approximately 86% of all males 15 and over), only about 56% (50% of all males aged 15 and over) earn farm income and only about 39% (34% of all males aged 15 and over) earn 50% or more of their total income from farming. The contribution of farm income to census-farm female total income is even lower. Again, there is the strong impression that net self-employment farm income plays a small role in the income equation of a large share of Canada's census-farm population. It certainly raises questions about the extent to which farmers roll profits back into their capital stock and the role income in kind plays in the economic livelihood of farm families.

2.7.2. Methodological Notes on Interpreting Farm Incomes

When comparing incomes before deductions (specifically taxes), between census-farm and urban areas, it is important to keep the following constantly in mind:

1. Income is a flow concept. It measures only a return to factor endowments hired for a period of time (i.e., a person with certain skills earning a wage or salary), or a return to ownership or rental of factors of production (a farmer operating his own or rented land and machinery). Since income flows may be interrupted at any time due to health problems, unemployment (in cases of wages and salaries), harvest disasters in farming, etc., income received over a particular time interval may not necessarily represent either potential or usual income. Thus, the rationale behind Canada's census and the snapshot principle (that income reported can be assumed to represent the average income situation of the "average" person reporting income) applies more to relatively stable wage and salary urban workers than to self-employed farmers.

2. Whenever income questions are enumerated by a census, truthfulness of replies, accuracy of recall, etc., will be in some doubt.

3. Census-reported earnings do not always represent total "earned income before deductions". Persons with self-employment income are permitted to report income after operating costs. Such costs may be exaggerated (i.e., covering capital deepening as well as legitimate depreciation and operating costs). Further, if self-employed farmers also earned off-farm wage and salary income, we can imagine overstatement of operation costs towards reducing total taxable income. If such manipulations have been carried out by farm operators, is it not reasonable to assume that the resulting figures would also be reported to the census so as to be consistent with forms completed for Canada's tax department?

4. Income may also take the form of "income in kind". Some occupations simply have greater opportunities to produce and consume their own output without having to go through the largely monetary market place. The production of those who earn largely wage and salary income is compensated for by cash income with which they then purchase goods and services. Those in the self-employment labour force are compensated for their production only partly

by cash income. To a considerable extent, they produce and consume goods without a monetary transaction. Farm populations are most prone to receive income as income in kind, and increasingly so the less developed the monetary system and market economy.

5. Income does not adequately represent "levels of socio-economic well-being" because it does not take into account differentials in wealth (i.e., a stock concept). Thus, for two persons with different wealth levels, interpretation of income flows means different things. One of the most difficult questions to answer, and one which cannot be answered here, concerns the extent to which the over-all well-being of farmers would increase or decrease relative to the well-being of non-farm persons if capital stock of each population subgroup could be translated into income flows. With rising land prices and inflation, there can be little doubt that ownership of land is becoming increasingly important to the well-being of farmers.

6. Income tells us nothing about levels of living as reflected in publicly provided amenities and facilities or those indigenous to the area. Thus, persons with a high level of income but no access to running water, public transportation, etc., will have a lower level of living than others with the same income but access to such facilities (all else held constant).

7. Income tells us nothing about relative costs of food, clothing, taxes, housing - all of which have differential impact on the consumption power of the dollar.

8. Income levels tell us nothing about relative income (an economic concept) or relative deprivation (a sociological concept), unless we know something about the distribution of incomes within and between areas and the relative deprivation in standards of living attainable.

With the above in mind, we may well ask whether there is any sense in discussing incomes of farm persons outside the farm sector. The entire income question is further confused by the fact that our referent year (1970) was not a good year for wheat farmers. As wheat is by far Canada's most important crop, it is of some importance that declining exports (1965 - 68) resulted in (i) unsold stocks, (ii) voluntary reduction of wheat plantings by about 15% in 1969 - 70, and (iii) a one-year federal scheme to remove up to 22,000,000 acres of prairie land from wheat production in 1970.

How important is the wheat problem to our discussion of incomes? While producer incomes were boosted by government aids promoting shifts into production of barley, forage, oilseeds and livestock, the fact remains that total net farm income in Canada's farm sector was about 14% less than the 1961 - 71 average. Does this justify an upward adjustment of total incomes to farm operators and their family members, etc., and, if so, how much? This question is well-nigh impossible to answer for two reasons. First, as we shall see, off-farm employment and non-employment income contributes substantially to total farm operator and farm family incomes. In some provinces, indeed, farming seems to be

a minor source of income, on average. If a large proportion of Canada's farm population are persistently off-farm income earners, then a reduction in farm income *per se* will have much less impact on total cash incomes. Second, high off-farm incomes (in the face of production cutbacks on the farm) could be due to farmers simply reallocating their labour input to wage and salary work. Thus, if low farm incomes were successfully supplemented by persons temporarily seeking off-farm work, total incomes might not be appreciably less than would have resulted from a "good" farm year. The entire question is, of course, empirical and remains largely outside our field of investigation. Nevertheless, our reasoning denies the temptation to adjust total incomes upward to accommodate for the dip in farm performance during 1970.

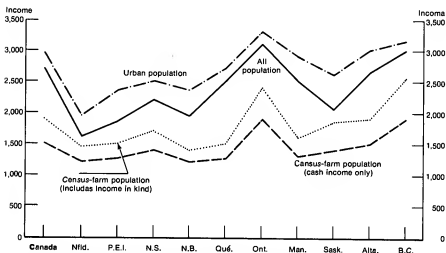
Without doubt, each problem noted above serves to place into question the validity and utility of estimating intersectoral income comparisons. At the same time, however, we must acknowledge the persistent call for ball-park estimates of how incomes in Canada's farm sector measure up. Thus, keeping the disclaimers noted above strongly in mind, the balance of this section is devoted to crude intersectoral income comparisons.

2.7.3. Average Incomes and Between Sector Comparisons

Chart 2.3 graphs per capita incomes of the total, urban and census-farm population of Canada and the provinces. The data are presented in this way with a view to tracing differentials among provinces as well as between population subgroups.

Chart 2.3

Per Capita Incomes of Total and Urban Populations Versus Census-farm Population with Cash Income Plus Income in Kind and Census-farm Population with Cash Income Only, Canada and the Provinces, 1971



Sources: Statistics Canada, 1971 Census, Vol. I.1, Table 10 and Vol. III.1, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Considering reported "cash income" only (from all sources), per capita figures for Canada's farm population are about 0.54 that for Canada's total population. The fraction increases to about 0.69 when we enter a crude adjustment to cash per capita income for income in kind. (See Appendix A.5, Glossary of Terms.⁶) As we have noted previously, income levels are generally higher for each population subgroup in Ontario, Alberta and British Columbia. (See Appendix A.5, for a glossary of terms and a list of the census income questions.)

See footnotes on page 77.

TABLE 2.19. Average and Median Income of Total Population, Urban Population and Census-farm Population Aged 15 and Over with Income, and Ratio Median to Average Income, Canada and Provinces, 1971

Area	Average income				
	Total population		Urban population		Census-farm population
	1	2	3		
	dollars				
Canada	5,033	5,317	3,633		
Newfoundland.	3,816	4,382	3,216		
Prince Edward Island	3,416	4,109	2,734		
Nova Scotia	4,210	4,704	3,164		
New Brunswick	3,946	4,408	3,004		
Quebec	4,969	5,199	3,585		
Ontario	5,459	5,634	4,208		
Manitoba	4,452	4,842	2,938		
Saskatchewan	3,926	4,497	3,097		
Alberta	4,978	5,321	3,664		
British Columbia	5,255	5,329	4,624		
	Median income			Ratio median to average income	
	Total population	Urban population	Census-farm population	Urban population	Census-farm population
	4	5	6	7	8
	dollars				
Canada	3,943	4,288	2,389	0.81	0.66
Newfoundland.	2,727	3,309	2,057	0.76	0.64
Prince Edward Island	2,368	2,920	1,856	0.71	0.68
Nova Scotia	3,181	3,645	2,183	0.77	0.69
New Brunswick	2,964	3,417	2,019	0.78	0.67
Quebec	4,048	4,303	2,724	0.83	0.76
Ontario	4,426	4,625	2,715	0.82	0.65
Manitoba	3,320	3,761	1,910	0.78	0.65
Saskatchewan	2,725	3,368	1,914	0.75	0.62
Alberta	3,746	4,175	2,251	0.78	0.61
British Columbia	4,093	4,179	3,023	0.78	0.65

Source: Statistics Canada, 1971 Census, Vol. III.1, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Of course, a danger with comparing average income, especially between aggregated subgroups, is that disparities between median and average income may be larger among each subgroup. To illustrate, Table 2.19 represents average and median per capita income of each group of persons aged 15 and over who earned income. Columns 7 and 8 provide an important comparison between median and average incomes. First, observe that the disparity between the urban and census-farm population subgroups is about 10% - 20% (excluding Manitoba). In effect, this means that the distribution of income is more unequal in rural farm areas than in urban areas. However, for the census-farm population, note also that the ratios are more even among provinces (Quebec being an exception). This implies that, for the purpose of drawing relative comparisons, we are safer comparing average income between provinces for census-farm populations than we would be if we were to analyze urban populations. This should be kept in mind, as much of our discussion pertains to average incomes of census-farm populations.

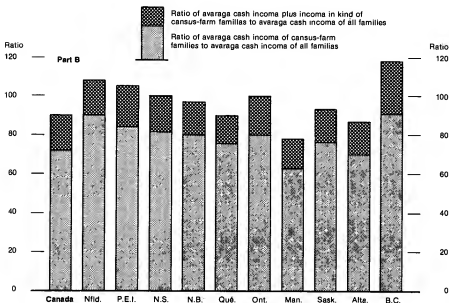
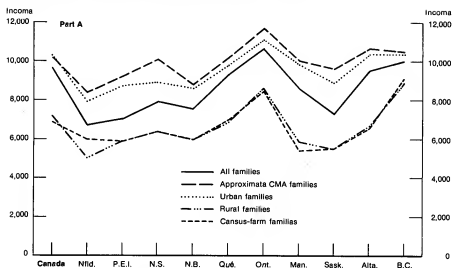
Chart 2.4, Part A, compares average total incomes again, but for census families residing in census metropolitan areas, urban areas in general, all families taken together, census-farm families and rural non-farm families. (Of Canada's 366,000 total census-farm operators, 326,000 reside on farms of which 303,000 reside on farms as members of families; the latter group represents census-farm families for our purposes.) The important finding in this case is that the income gap between census-farm and non-farm populations is narrower when the unit of comparison is the census family. As against the previously noted ratio of 0.54 for the two groups of persons aged 15 and over, the ratio of average income of Canadian census-farm families to that for urban families is approximately 0.69 and for all Canadian families is approximately 0.72. Of course, the reason for the reduction in the gap between incomes of census-farm and all families is that census-farm families are typically larger, with more members contributing to total family income.

As a clue that the ratios above may represent an improvement over the last decade, we refer to results of Buckley and Tihanyi (1967) and the 1958 farm family income sample survey. At the beginning of the 1960's, census-farm family income (approximately \$3,600) was about 37% less than that of the urban family (approximately \$5,800). This is somewhat higher than the 31% observed for 1970 (see Chart 2.4, Part A), and might be higher still if we were able to adjust the 1970 income situation for real capital gains over the 1958 - 70 period, etc.

Again, Chart 2.4, Part A, attests to a similar pattern of family income differentials between provinces as was observed for groups of census-farm versus urban persons aged 15 and over. Note also that average income of census-farm families is usually slightly in excess of that of rural non-farm families; if this were also the case at the small-area level it would imply that, in order for census-farm family heads to improve incomes through off-farm migration, they may have to migrate directly to urban areas.

Chart 2.4

Comparison of Average Total Family, Urban Family, CMA Family, Rural Family and Census-farm Family Income, Canada and Provinces, 1971



Sources: Statistics Canada, 1971 Census, Bulletin AH-4, Catalogue 93-745; and 1971 Census, unpublished tabulation from the Agriculture-Population Linkage.

Chart 2.4, Part B, represents a more realistic comparison of incomes of all families versus census-farm families when income in kind is added to census-farm family incomes. This addition increases the ratio of census-farm family to total family income to 0.9. Indeed, in the provinces of Newfoundland, Prince Edward Island, Nova Scotia, Ontario and British Columbia census-farm families appear to fare relatively well in comparison to their counterparts residing in non-farm areas. Provinces with the greatest farm family/non-farm family income gap would appear to be Manitoba, Alberta and Quebec.

Considering again only cash incomes, Chart 2.5, Parts A and B, relates to proportions of families with high and low income levels. Interpretation of Part A rests on the assumption that \$4,000 total farm family income per year versus \$4,500 total urban family income per year (before tax deductions) is a reasonable "low-level income cut-off line" for gauging poverty in both rural and urban areas. In defence of this assumption, consider the following:

1. Canada has no official poverty lines but Statistics Canada initially developed and updated 1961 low-level income cut-off lines which have been used by the Economic Council of Canada in its 5th and 6th annual reviews.⁷

2. The revised low-level income cut-off lines (based on expenditure data from the 1969 family expenditure survey⁸) are (i) approximately \$4,650 for an "average" urban family of 3.0-3.5 persons for 1970 (the census referent year for reported income), and (ii) approximately \$4,150 for an "average" rural farm family of 4.0-4.5 in 1970. Both income cut-offs are standardized for location of residence, meaning there is no need to adjust for effects of income in kind. At first impression, the rural farm family size of 4.0-4.5 (actually 3.9) may seem small; recalling migration patterns and the prevalence of older family heads, however, underscores the fact that a large proportion of census-farm families are "empty-nest" families.

Using these figures as cut-offs, we have no illusions that this is little more than a statistical device which helps us monitor the general situation, thereby permitting some analysis of size and characteristics of the low income population.

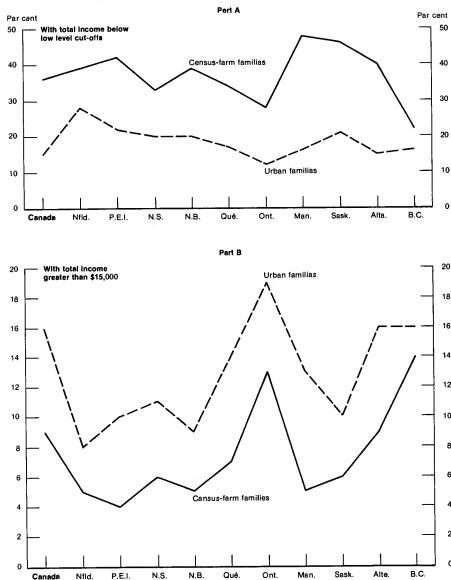
With this in mind, Chart 2.5, Part A, reveals approximately 36% of Canadian census-farm families below this line versus approximately 15% of urban Canadian families, or about 2.4 times as many. In Part B, the gap between proportions with higher levels of family income is somewhat larger: about 8% of census-farm families attain \$15,000 or more total income per year as against about 16% of Canada's urban families, or a ratio of about one half. Not only are low and high income level gaps relatively constant between provinces, but again we observe all family subgroups co-varying similarly between provinces.

As noted previously, problems of interpreting incomes relate not only to absolute level but to the actual and psychological adequacy of that level.

See footnotes on page 77.

Chart 2.5

Percentage of Urban Families and Census-farm Families with Total Income Below Low Level Cut-offs⁽¹⁾ and Above \$15,000, Canada and Provinces, 1971



(1) Census-farm families with less than \$4,000 total income and urban families with less than \$4,500 total income.

Sources: Statistics Canada, 1971 Census, Vol. 11.2, Table 81; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Adequacy of income, then, depends not only on sustaining a reasonable subsistence level of living, but on perception of the gap between what one has and what others have. Statistically then, we can imagine within subgroup, within area, and between area inequality in incomes. Perception of such inequality results in relative deprivation. Thus, in evaluating incomes of Canadians, deeming that Y dollars are necessary to purchase X goods toward attaining a minimum "Canadian way of life" is only one part of the picture. The other part bears on relative deprivation, which stems from the perception of what others have. In a society where almost no one starves, given an incredible infrastructure of social security services, can we assume that this dimension is less important? In a society where information about amenities, standards of living, etc., is almost perfect (in comparison with less affluent societies), can we assume that Canadians are not aware of what others have?

Thus, gauging this dimension of income adequacy is not only of considerable importance, but failure to attempt to do so means that judgments cannot really be made about the relative well-being of census-farm persons versus their non-farm counterparts. Needless to say, this study, which draws almost entirely on census sources, can at best provide limited insights into this highly complex problem.

Our attempt to evaluate adequacy of income is necessarily crude and, at best, only suggestive of ways to make more meaningful interpretations of income. Table 2.20 A represents three crude income measures and one somewhat refined measure. The first measure P seeks to gauge the level of poverty by measuring proportion of census-farm family members with per capita incomes less than those implied by low-level income cut-offs. In the formula given, the low-level income cut-off is denoted by the symbol c . For census-farm families $c = \$1,000$. This figure derives from the previously cited source. For urban families $c = \$1,400$.

Inequality, I, within census-farm areas and for urban areas is calculated using the Gini coefficient of concentration. Relative deprivation, D, is represented by the ratio of average per capita income for the census-farm population to the same for urban areas, minus one. For each measure P and I, $0 \leq P, I \leq 1$. Thus, for $I = 0$, there is total equality of incomes. For census-farm areas and D, $0 \leq D \leq 1$, whereas for urban areas $D = 0$ as it represents our referent or "ideal".

Given that we are using low-level income cut-offs that were derived specific to place of residence, income in kind considerations were built into the rural farm cut-off. Thus, there is no need to refine P by adjusting for effects of income in kind. On the other hand D* is refined by attempting to adjust for the greater "buying power" of the dollar in rural than in urban areas.

To do this, we first separate rural and urban per capita income into that share spent on basic needs where prices are likely to differ considerably for a similar profile of goods and services. In Table 2.20 A the share of rural per capita

income spent on such items is denoted as γ_r ; γ_u denotes the urban share. In turn $(1 - \gamma_r)$ denotes the rural share of per capita income spent on items which are likely to be just as costly in census-farm areas as in urban areas.

TABLE 2.20 A. Measures of Income Adequacy

Symbol	Concept	Surrogate	Formula	Variable definitions
P	Low income cut-off or poverty measure	Proportion of family members with per capita income less than \$1,000	$P = \frac{c}{\sum_{i=1}^c F_i} / \frac{q}{\sum_{i=1}^q F_i}$	F = families i = per capita income of family members q = observed ceiling on "i" c = low income cut-off point $P = 0 \leq 1$
I	Inequality	Gini coefficient of concentration	$I = \frac{1}{2} \sum_{i=1}^n (X_i - 1) Y_i - X_i Y_i - 1$	X = cumulative percentage share of population Y = cumulative share of income i = population subgroups n = number of groups $I = 0 \leq 1$
D	Relative deprivation	Ratio per capita income of census-farm population to same of urban population	$D = 1 - (PCI_r / PCI_u)$	PCI = per capita income of all family members r = rural farm areas u = urban areas $D = 0 \leq 1$
D*	Refined relative deprivation	Adjusting D by equating the "Buying Power" of the dollar in rural farm versus urban areas	$D^* = \left\{ 1 - \left[\frac{(PCI_r - \gamma_r) PCI_u - \gamma_u (PCI_r - \gamma_r)}{[PCI_r \cdot (1 - \gamma_r)]} \right] \right\} / PCI_u$	γ_r = per cent of PCI_r spent on goods and services $X_1 \dots n$ where the cost differs substantially between rural and urban areas for $X_1 \dots n$ of roughly the same quantity and quality γ_u = same as γ_r but for urban areas $1 - \gamma_r$ = Per cent of PCI_r spent on goods and services $Y_1 \dots n$ where urban and rural cost or price is roughly equal $\frac{PCI_u - \gamma_u}{PCI_r - \gamma_r}$ = multiplier to adjust PCI_r dollars to equivalent buying power, re: urban dollars

Admittedly, choice of specific items to be included in the "less costly" category is not only arbitrary but proceeds under highly risky assumptions. However, it seems reasonable to expect that prices of basic needs such as food, shelter, household operation, clothing, personal care, recreation, etc., are considerably lower in rural than urban areas. Conversely, prices of household appliances, medical and health care, automobiles, travel, etc., would likely be more equal between sectors. Also, if expenditures are estimated specific to family size and province of residence, it would seem reasonable to expect that lower total expenditures by a typical rural than an urban family of, say, four persons on these basic needs is indicative of greater "buying power" of rural dollars. Of course, this interpretation rests on the assumption that the quality of such basic needs does not differ greatly between sectors. Indeed, it could be argued that access to farm

fresh produce, hand crafted clothing, mountain and stream recreation, and more open living with access to private gardens, play area, parking area, etc., holds the promise of greater quality.

As crude as this approach may be, it at least provides some basis for comparing absolute levels of family income between census-farm and urban areas. Again, adjustments of this nature need only be made to rural incomes, since the

TABLE 2.20 B. Ratios of Measures of Income Adequacy¹

Area	P_r	I_r	D_r	D_r^*
Canada	0.37	0.45	0.49	0.23
Newfoundland	0.44	0.41	0.38	0.17
Prince Edward Island	0.41	0.42	0.46	0.21
Nova Scotia	0.34	0.41	0.44	0.20
New Brunswick	0.41	0.43	0.49	0.22
Quebec	0.43	0.43	0.53	0.22
Ontario	0.26	0.42	0.41	0.21
Manitoba	0.46	0.46	0.55	0.27
Saskatchewan	0.44	0.47	0.45	0.22
Alberta	0.40	0.48	0.49	0.24
British Columbia	0.21	0.40	0.39	0.19
	P_u	I_u	P_r/P_u	I_r/I_u
Canada	0.18	0.29	2.06	1.55
Newfoundland	0.32	0.31	1.38	1.32
Prince Edward Island	0.26	0.32	1.58	1.31
Nova Scotia	0.24	0.30	1.42	1.37
New Brunswick	0.24	0.31	1.72	1.39
Quebec	0.20	0.31	2.15	1.39
Ontario	0.14	0.26	1.86	1.62
Manitoba	0.19	0.31	2.42	1.48
Saskatchewan	0.24	0.31	1.83	1.52
Alberta	0.17	0.30	2.35	1.60
British Columbia	0.18	0.25	1.17	1.60

¹ See Table 2.20 A for definitions of terms.

urban sector serves as our referent. To make the adjustments, we used 1969 "patterns of expenditure data" produced by the Prices Division of Statistics Canada in its *Family Expenditure in Canada* series (Vol. I-III). Ratios calculated for D^* in Tables 2.20 A and B are based on average expenditure data of a rural versus urban family of four persons.

In Table 2.20 B we observe that levels of P_r are relatively high for all provinces but Ontario, British Columbia and Nova Scotia; the ratio of P_r/P_u is on average two, and highest for Quebec, Manitoba and Alberta, and lowest for Newfoundland, Nova Scotia and British Columbia.

As noted previously, in comparisons of average and median income of persons aged 15 and over with income, we expected greater inequality of income in Canada's census-farm sector. Table 2.20 B, Column 2, presents values of I — the Gini coefficient — which, in comparison with the same for urban areas, are about 1.5 times as large.

Turning to our measure of within province or intersectoral deprivation, D , again we find that Ontario, British Columbia and Newfoundland have lowest scores (Column 3). If D^* were a realistic representation of comparability between census-farm and urban per capita incomes, we might think that the census-farm income situation is not as bad as is typically assumed. While values for D^* imply nothing about equality of census-farm incomes they do imply that, at least, the average level about which distributions gravitate between sectors is closer. The question raised by this exercise is: If we could adequately measure the extent to which farmers plough profits back into their capital stock in excess of depreciation (and we have good reason to suspect they do), and if we could gauge the proportion of operators that use their farms as a "tax write-off" on earned off-farm cash income, or as a hobby farm (implying less than full use of resources), would average census-farm family incomes not rise even higher?

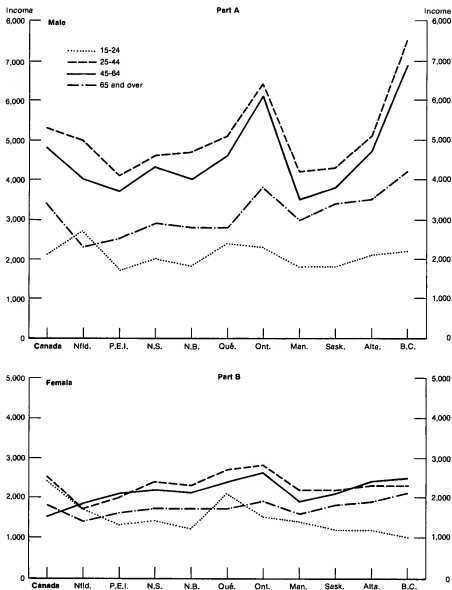
2.7.4. Some Demographic and Industrial Aspects

In Chart 2.6, Parts A and B, we observe a strong positive relationship between age and incomes for census-farm males aged 15 and over and a much flatter age: income differential for females. A positive relationship is expected as movement along the life cycle implies greater accumulation of education, experience, seniority and working capital — all well-known correlates of higher income. Higher income among census-farm males aged 25 - 44 (than those 45 and over) is probably attributable to higher levels of educational attainment in this age group, particularly when it is applied to obtaining off-farm work.

That female average incomes differ only slightly by age is probably due to the fact that females often interrupt their labour force activity due to childbearing (disruption of seniority), work more in part-time, unspecialized jobs which yield a relatively standardized rate of return, and are involved to a much lesser extent in

Chart 2.6

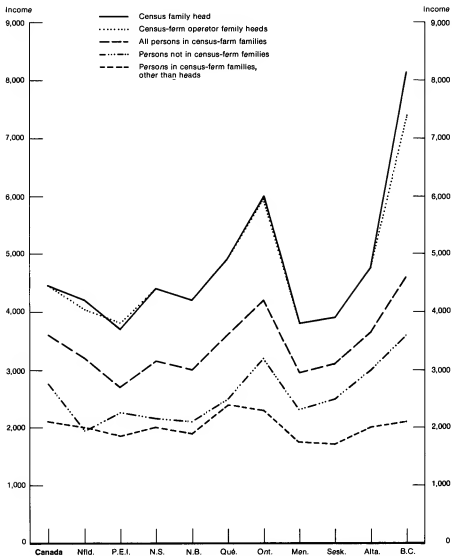
Average Total Income of Census-farm Population Aged 15 and Over with Income by Sex and Age, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 2.7

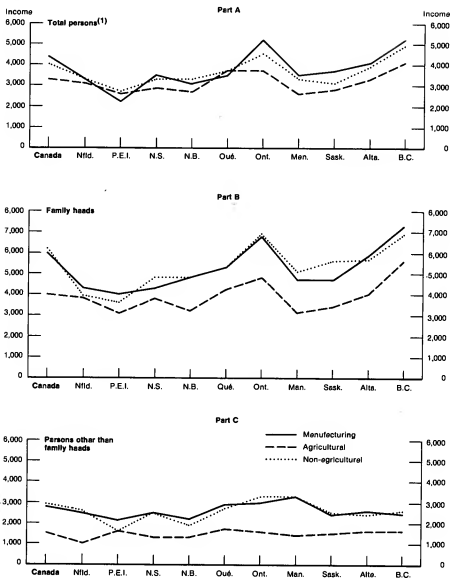
Average Income of Census-farm Population Aged 15 and Over with Income by Family and Head Status, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 2.8

Census-farm Population Aged 15 and Over Showing Average Employment Income by Industry, Canada and Provinces, 1971



(1) Excludes persons with no income or a loss.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

self-employment occupations where accumulation of capital over time (e.g., with increasing age) tends to be associated with higher personal income returns. Thus, accumulation of "human capital" is less prevalent.

The reasoning above may lie at the basis of the relatively flat and low income levels between provinces for "persons in farm families excluding the head" (Chart 2.7). These persons are largely females (73%). In contrast, as persons not in census-farm families are largely males, we observe similar income peaks between provinces for this subgroup as for census family heads (who are predominantly males also) and census-farm family heads (again, predominantly males).

Chart 2.8 points up a number of interesting facets about census-farm income earners employed in different industries. For those reporting employment in manufacturing or non-agricultural industries during "census week", average male incomes (in Part B, most census family heads are males) are on average 1.5 times those of census-farm heads reporting employment in agriculture. Clearly, if non-agricultural employment opportunities are available, and if farm family persons meet skill requirements, then trends in Chart 2.8 leave few doubts that pecuniary reasons for leaving the agricultural industry are strongly positive in all provinces. Of course, this generalization is based on 1970 data with the strong possibility that had 1970 been a "good wheat year", its applicability to the Prairie provinces would be weakened. A second observation applies largely to census-farm females in that the flat rates of return to manufacturing and non-agricultural versus agricultural incomes (Chart 2.8, Part C) are for income earning non-family heads who are about 60% female.

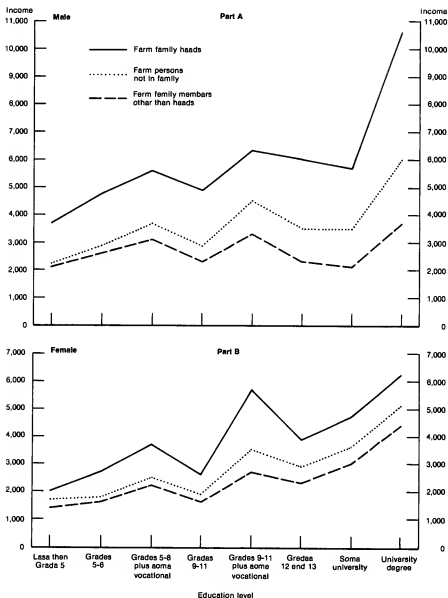
2.7.5. Select Aggregate Socio-economic Interrelations

One of the most important questions to be evaluated in this study concerns the influence of education on levels of attained income. That higher levels of education can be expected to be positively associated with higher levels of total income hardly needs elaboration. The question needing clarification here is the extent to which different levels of education are associated with differential returns to farm versus non-farm economic activity.

Chart 2.9 addresses one side of this issue. Of course, our simple cross-classification between education and total income (i.e., total returns to farm and non-farm economic activity combined) neglects the effect of simultaneous relationships (see Huffman, 1974). While a positive relationship is clearly evident between education and income for census-farm males (Part A) and females (Part B), it is interesting to note the rise in income associated with education and vocational combinations (i.e., Grades 5-8, and 9-11) versus those educational levels without vocational schooling (Grades 5-8). Yet, over all, from Grades 5-8 up to "some university", the income trend is relatively flat, especially when compared with the income jump associated with obtaining a university degree.

Chart 2.9

Average Total Income of Census-farm Male and Female Family Heads, Family Persons and Non-family Persons Aged 15 and Over with Income by Level of Education, Canada, 1971



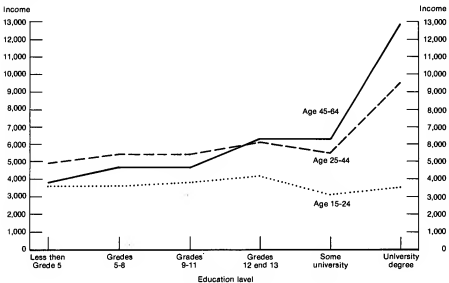
Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

That returns to female farm family heads with Grades 9 - 11 with vocational schooling are almost as high as for those with a university degree may be attributable to (i) the possibility that females with Grades 9 - 11 and vocational school qualify for relatively high-paying technical jobs while females with university degrees are awarded relatively low-paying professional jobs (i.e., a strong discrimination factor), or that (ii) females with vocational schooling represent persons expending effort to extend themselves toward a better full-time job, whereas a university degree does not necessarily imply striving for a full-time profession in the case of females. With respect to our former point, it is unfortunately not unusual to see a female endowed with a university degree earning little more than one with less than high-school graduation plus some vocational training.

Chart 2.10 provides some surprising results for male census-farm family heads aged 15 - 24 (largely employed as farm operator heads) when contrasted to the more or less similar education-income relationship observed for male family heads aged 25 - 44 and 45 - 64. There is an apparent lack of relationship among those of younger ages. This could be due to insufficient time to accumulate needed capital endowments for farming or that many of these young operators are still in school and thus are only working part-time or during the summer.

Chart 2.10

Average Total Income of Male Census-farm Family Heads by Age and Level of Education, Canada, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

The most dramatic illustration of the significance of a university degree on total earned income is provided in Table 2.21. In comparison with other levels of education, the proportion of census-farm males earning total income in excess of \$10,000 jumps threefold over any other category, while the corresponding jump for females is about sevenfold.

TABLE 2.21. Percentage of Census-farm Population Aged 15 and Over with Income Who Earned More Than \$10,000 in 1970, by Educational Level, Canada, 1971

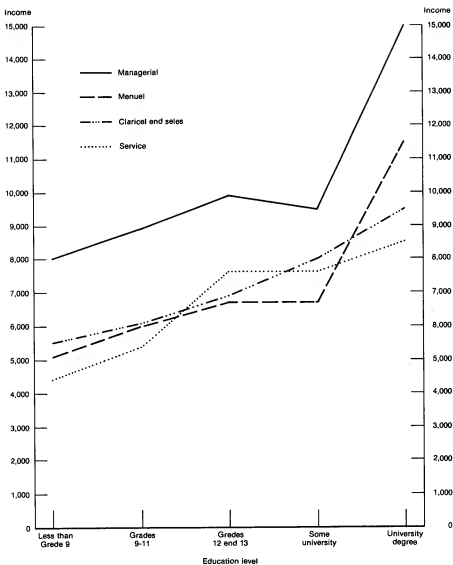
Sex	Education level				
	Less than Grade 5 1	Grades 5 - 8			per cent
		Without vocational training 2	With vocational training 3		
Total	3.7	6.8	7.9		
Male	4.6	8.3	10.4		
Female	0.6	0.9	1.0		
	Grades 9 - 11				
	Without vocational training 4	With vocational training 5	Grades 12 and 13 6	Some university 7	University degree 8
	per cent				
Total	6.3	7.4	5.1	5.6	23.7
Male	8.5	12.5	8.4	8.0	28.0
Female	0.8	1.4	1.1	2.9	15.0

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

When we look at the relationship between education and off-farm employment, the bearing of education on off-farm employment income is more elastic (see Chart 2.11). As mentioned previously, the share of census-farm operators reporting off-farm occupations during census week was approximately 34%, including 17% manual, 3% clerical and sales, 3% managerial and 2% service.

Chart 2.11

Average Off-farm Employment Income of Census-farm Operators with Non-farm Occupation During "Census Week" by Level of Education and Select Occupational Group, Canada, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Other data (not shown here) focus more clearly on the question of income returns to education, with changing degrees of reliance on farming as a source of income. These data show that among census-farm males aged 15 and over with income but with only 0% - 24% of their total income originating from farming, we observe the sharpest upward incline (compared to other groups having greater reliance on farming) in income with education, although the notable jump in income associated with a university degree is ever present.

Unhappily, it appears that, with increasing reliance on farming as a source of income, not only are incomes considerably lower but less elastic with respect to education. When we consider only males earning 75% of their total income from farming (data not shown here), the relationship between educational levels and income becomes less clearly defined except for those attaining only Grade 5 education or less. Fortunately, our interpretation of this somewhat disconcerting trend does not end here; there appears to be an intervening variable — the tendency to underreport income with higher level of education — which may be obscuring the relationship. This will be discussed more fully in Chapter 4, Section 4.5.

2.8. A Note on Farm Dwelling Characteristics

The economic well-being of households located on census-farms, as reflected in dwelling characteristics is extremely difficult to evaluate. Unlike families in urban dwellings, questions to do with ownership status, number of rooms, age of structure, number of bedrooms, sale value, etc., provide few insights. Farm dwellings are often very old, spacious, inseparable (in value) from the large properties they are located on, and are usually part of a family heritage. Unlike urban housing, a large share of which is comparable in terms of a number of standard building criteria, comparison of farm dwellings is difficult to make even within the farm sector.

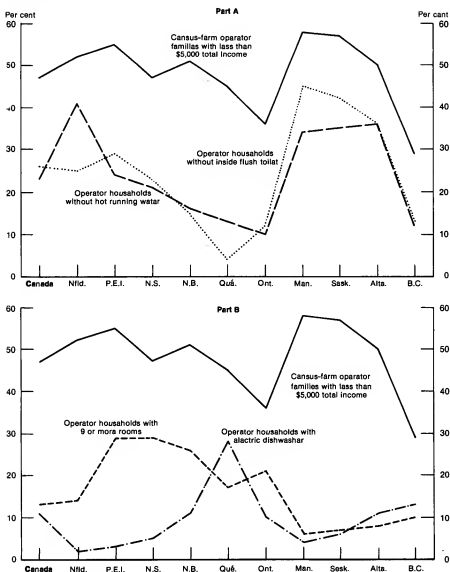
On the other hand, some dwelling facilities are somewhat more amenable to comparisons between the farm and non-farm sector. The only point we wish to make here is that as income permits consumption of goods and services (of which dwelling facilities are an important part), availability of basic and "luxury" facilities could be used as an index of the well-being of census-farm households.

Chart 2.12, Parts A and B, tends to support the hypothesis that select dwelling facilities are positively related to levels of income. In Part A, a very close positive relationship is evident between the "percentage of households with no flush toilet" and "no hot running water" and the "percentage of farm families with total income less than \$5,000". In Part B, we also observe a very close negative relationship between percentage of operator households with electric dishwashers and percentage of families with less than \$5,000 total income.⁹ If

See footnotes on page 77.

Chart 2.12

Percentage of Census-farm Operator Families with Total Income of Less than \$5,000 and Percentage of Census-farm Operator Households by Selected Dwelling Facilities, Canada and Provinces, 1971



Sources: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

income is positively related to the consumption of dwelling facilities for Canada's population as a whole, as we know it is, then the presence of lower income households in Canada's farm sector imply that those farm households have fewer basic and "luxury" dwelling facilities than their non-farm counterparts.

2.9. Summary

The preceding sections have sought to set out general variations in the geographic, socio-economic and demographic profile of Canada's farm population. A summary of our empirical findings would include the following:

1. Canada's farm population can be divided into three components: population residing in farm operator households located on census-farms, population residing in farm operator households located at places other than on census-farms, and population residing in other households located on farms but which do not contain a farm operator member. Of Canada's 1,756,000 "farm population", approximately 85% are of the first component noted above, 10% the second, and 5% the third. This study focuses largely on the first component; for purposes of this study, this component has been termed census-farm population. Our use of this term differs from that of the 1971 Census of Agriculture as reflected in its published bulletins, in which "census-farm population" is used to mean the first and third components noted above.

2. Not only are younger males and females more migratory from census-farm areas than those in the older age categories but females are more migratory than males. Both trends can be linked to less favourable labour force and income opportunities in rural farm areas than non-farm areas. The age distribution also indicates upturn of migration in the older ages, i.e., "retirement migration".

3. Some 127,000 census-farm persons, or approximately 9% of Canada's total "farm population" migrated to or within Canada's farm sector. Inter-provincial migration was the major contributor to movement of these persons while immigrants played a small role. Over-all, Ontario and British Columbia are the major recipients of interprovincial migrants.

4. Approximately 93% of Canada's census-farm operators residing on farms are members of families, while approximately 91% of all census-farm persons aged 15 and over are family members. The age profile of family heads is similar to the age distribution in general, which is more heavily weighted to those in the older age categories. Smaller proportions of young families in census-farm areas tend to depress the effect of higher fertility rates on average family size, to the point that average sizes of non-farm families are about 3.5 - 4.0 in comparison to 4.0 - 5.0 for farm families.

5. Census-farm family heads are endowed with considerably lower levels of education than are their non-farm counterparts. About 60% of census-farm family heads have less than Grade 9 education, in contrast to about 40% for all Canadian family heads. The lower education profile is attributable to emigration of younger, more educated males and females, and lower opportunity cost to higher

education in farming. Levels of education are lowest in the Maritime provinces and Quebec, where we also find a disproportionate share of census-farm family heads in the older age categories. Where farm operators have taken vocational courses to upgrade their educational attainment, the largest proportion have taken non-agricultural vocational courses.

6. There are not only notable differentials in census-farm population educational attainment between provinces but ratios of non-farm to farm education between provinces also differ considerably. An implication is that, as education is important to the factor of mobility, immobility may be due to poorly educated operators wishing to migrate but who find they are at their place of best competitive advantage given the skills they have to offer at the market place.

7. Approximately 70% of census-farm population aged 15 and over worked some or all of 1970. Labour force participation rates in Canada's farm sector are generally higher than in non-farm areas due to the fact that farming is a self-employment industry which absorbs a large number of unpaid family workers.

8. In all provinces, there is a consistently lower proportion of census-farm population with income than for the total population. This is due largely to the reporting of zero or loss income by approximately 15% of the working census-farm population (i.e., largely farm operators).

9. Approximately 30% of census-farm persons and 25% of farm operators have been classified as employed in non-agricultural industries during census week. Most of these are wage and salary earners in the trade, commerce and service industries. The proportion of census-farm population engaged in non-agricultural industries decreases with prosperity of the farming area. Thus, it is lowest in the Prairies, highest in the Maritimes.

10. A considerably smaller proportion of females in the census-farm population are income earners (0.28) than among their non-farm counterparts (0.41). This applies for all provinces. As opportunities for earning income are lower for census-farm females, there is every reason to expect that female emigration in search of better paying jobs in non-farm areas is at the basis of the underrepresentation of younger females in the census-farm female age distribution.

11. As important as evaluation of farm operator and family income is to this inquiry, it is important to bear in mind that cash income is only a partial measure of income in farming areas and levels of living in general. For example, it does not take into consideration "income in kind", differentials in wealth, amenities or facilities of the place of residence, or relative deprivation associated with perception of income inequality. Representativeness of net self-employment farm income levels in any given year is also discussed and problems associated with our 1970 data noted (i.e., 1970 was a poor year for wheat farmers).

12. Acknowledging the crudeness of farm/non-farm income comparisons, we found per capita incomes for Canada's census-farm population about 0.54 that of Canada's total population. The fraction increases to 0.69 when a crude adjustment

is made for "income in kind". In all comparisons by provinces, we find that income levels are higher in Ontario, Alberta and British Columbia.

13. Median census-farm family incomes are about 10% - 20% less than average income figures; this is a somewhat larger gap between the two measures of income than is observed for urban areas, indicating greater inequality of incomes in the former case. At the same time, we observe that ratios of median to average income of census-farm persons are more even between provinces than ratios of the same for the urban sectors of each province.

14. When we compare census-farm family income with averages for all Canadian families, the previously noted ratio of 0.54 for persons rose to 0.72 for families; with addition of income in kind the ratio rose to 0.9 for families. In the provinces of Newfoundland, Prince Edward Island, Nova Scotia, Ontario and British Columbia, census-farm families appear to compare fairly well with their non-farm counterparts. In almost all cases, census-farm families have higher average income than do rural non-farm families.

15. Although Canada has no official poverty lines, Statistics Canada has developed low-level income cut-offs which have been used to establish that approximately 36% of census-farm families versus 15% of urban families were below the cut-off point. It is to be emphasized that these cut-offs relate only to family incomes for 1970 and neglect other important factors bearing on economic well-being such as capital gains, etc.

16. Crude attempts to evaluate dimensions of adequacy of income for census-farm families indicate that for provinces and census-farm areas the Gini coefficient was on average 1.5 times that for urban areas, whereas ratios of census-farm per capita incomes to the same for urban areas was about twice and was highest for Quebec, Manitoba and Alberta. A refined measure of per capita income tends to reduce the gap between farm and non-farm areas considerably.

17. Age and total income are positively related, though more so for males than females. A positive relationship is expected on the grounds that older age implies accumulation of experience and capital stock, conducive to higher output in self-employed activity and seniority in wage and salary jobs. Lack of a relationship for females can be attributed to higher proportions of females working at unpaid family work, taking part-time jobs, interrupting their labour force careers (and therefore seniority), and being discriminated against.

18. The incomes of census-farm persons employed in non-farm industries are, on average, 1.5 times those of farm incomes.

19. While there is a definite positive income-education relationship among census-farm males, the relationship is not very elastic nor does it exist to the same extent for females. In all provinces, the income-education relationship could be described as relatively flat up to the level of "university degree" at which point levels bound upwards. Further scrutiny reveals that when the income source is non-agricultural the income-education relationship is much more linear and positive than when the income source is agricultural. Unhappily, it appears that with increasing reliance on farming as a source of income, returns to higher education are less direct.

20. Dwelling facilities such as the presence of flush toilet, running water, etc., are positively correlated with income levels. Dwelling characteristics are less so, probably because of measurement problems. That is, census-farm dwellings are usually very old, and large structures are often passed down; thus they are not amenable to qualitative or quantitative evaluation in the same way as urban homes that have been built recently and conform to relatively well standardized building criteria.

FOOTNOTES

¹ Actually, in the Census of Agriculture publication and tabulation program both our census-farm population and other households on farms are included in "census-farm population" figures. The reason we exclude the third component from our figures is that we have little knowledge of who comprises this component. While it is likely that farm workers and their families consume a large share, relatives of the farm operator will also be in this subgroup. As our analytical concern is really with operators of census-farms and the degree to which they and their families are dependent on farming, we eliminate the more marginal components in the interests of expediting analysis or our major interest.

² Note, however, that exactness of 1971 Census data on female family workers is open to question as a large number of women who reported "housework" were incorrectly included.

³ The theory of human capital has been developed largely in the works of Becker (1964).

⁴ "Labour Force" refers to non-inmates 15 years and over, who, in the week prior to the 1971 Census enumeration, worked for pay or profit, helped without pay in a family business or farm, looked for work, were on temporary lay-off, or had jobs from which they were temporarily absent because of illness, vacation, strike, etc. Excluded, however, are female farm workers who indicated that they helped without pay in a family farm or business for less than 20 hours per week.

⁵ With a few minor exceptions, all income figures pertain to gross required to simply cover operation costs. That is, it is well-known that additions to capital stock above and beyond depreciation allowances are being reported as operation costs. For census definitions of a number of income components, see Statistics Canada (Catalogue 94-709, 1973).

⁶ Adjustments were made only to farm family income, as opportunities for income in kind in a largely wage and salary urban sector are much less prevalent. Average per farm family estimates were derived by dividing gross 1970 provincial estimates of income in kind by total number of farms of each province. Gross income in kind data were produced in Canada Department of Agriculture's yearly publication series *Net Farm Income*.

⁷ See Statistics Canada, "Revision of Low Income Cut-offs" (prepared by the Research and Analysis Section, Consumer Income and Expenditure Division, 1974). This paper was prepared as a follow-up document to J.R. Podoluk's (1970) original "low-level income cut-offs" prepared for her monograph on income of Canadians.

⁸ See Statistics Canada (Catalogues 62-535, 62-536 and 62-537).

⁹ However, some enumeration problems, likely associated with translation, were discovered in Quebec. As a result, a correction factor for electric dishwashers is available in 1971 Census of Canada, Bulletin 2.4 - 4.

CHAPTER 3

FARM FAMILY INCOMES: SOCIO-ECONOMIC PROFILES

3.1. Introduction

Having contrasted farm family incomes with those of all Canadian families, having provided crude impressions of farm family economic well-being, and having discussed inadequacies of income as a measure of levels of living, we now turn to evaluation of levels, components and sources of census-farm family incomes *per se*. As noted previously, we are dealing with approximately 304,000 families. That is, of Canada's 366,000 census-farm operators (resident and non-resident combined), 326,000 reside on farms of which 304,000 are members of families. For our purposes, these have been termed census-farm families.

Much of the analysis in this chapter concerns provincial differentials in farm family incomes by select farm family and operator head characteristics. (A glossary of terms is presented in Appendix A.5.) Although our discussion of income by source will touch on the link between off-farm employment and part-time or marginal farming, this subject is not explored fully in this study as it falls under the jurisdiction of another planned census monograph (useful references on the subject may be found however in Mage, 1974; University of Guelph, 1975). An attempt is also made to evaluate the bearing of a number of possible influences on farm family income using multiple regression techniques. In a final section, adequacy of the family farm concept is discussed in the light of recent trends in the organization of farm production.

3.2. Sources of Income

That off-farm employment has become increasingly important to Canadian census-farm families over the last few decades is clearly one of the most important structural features of Canadian agriculture (see footnote 5 to Chapter 1). As we shall see, this trend is apparent not only among marginal farmers; farm operators of large-scale farms derive a surprisingly large share of their income from off-farm employment as well. (For actual income questions upon which our analysis is based, see Appendix A.5.)

The 1941 Census of Agriculture reported that off-farm employment contributed, on average, about 13.7% to total farm family income whereas total off-farm income contributed approximately 17%. A 1958 farm survey reported the off-farm employment share at 25%, on average, and the total off-farm share at 37%.¹ The 1971 Ag-Pop Linkage found that, on average, about 60% of total census-farm family income was attributable to off-farm employment while 73%

See footnotes on page 125.

was attributable to all off-farm sources. An interesting comparison is found in the United States 1969 Census of Agriculture, which found 57% of total farm family income originating from off-farm employment.²

To some extent, the large difference in results of the 1971 Ag-Pop Linkage and the 1958 farm survey is due to poor performance of wheat farms in 1970 (as discussed in Section 2.7.2) when, for Canada as a whole, 1970 net self-employment farm income was about 14% less than the 1961-71 average. Yet, even if we adjust net self-employment farm income upward by a generous 40% (leaving off-farm employment income as is), 54% of total census-farm family cash income still derives from off-farm employment while 66% is attributable to off-farm income from all sources.

The shrinking contribution of net self-employment farm income (hereafter, farm income) as part of **total farm family income** is displayed in Chart 3.1. Note that in 1971, farm families in British Columbia, the Maritimes and Ontario are least dependent on farming as a source of income. Also, in no province does the contribution of farm income to total family income exceed income from off-farm sources. This point is further supported in Table 3.1 where the farm contribution to total farm family income is as low as 11.5% for Newfoundland and 12.5% for British Columbia. In other words off-farm employment income is at least two to three times more than farm self-employment income; in most provinces, off-farm non-employment income exceeds one-half that of reported farm income.

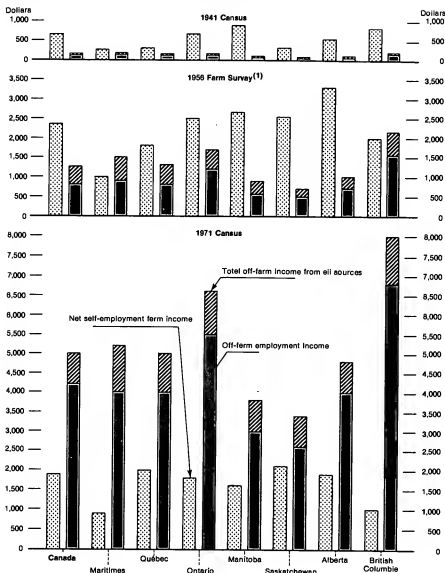
With respect to all census-farm persons aged 15 and over earning income, about equal shares report wages and salaries (41.2%; Table 3.2, Column 2) and farming (43.9%; Table 3.2, Column 3), as their major source of income. As a residual, self-employment non-farm, government transfers, pensions, etc., account for about 15%. Table 3.2 breaks this income-earning population into three subgroups; "farm family heads" (Part A), "members of census-farm families other than the head" (Part B), and "non-family members residing in census-farm operator households" (Part C). In all provinces, the first two subgroups are distributed similarly according to major source of income.³ The only major difference in distributions is observed for non-family members residing in census-farm operator households (Part C), in which a large share are older persons not in the labour force, who receive government transfers.

According to Table 3.2, Parts B and C, only for the Prairie provinces does it appear that farm families are generally more dependent on farming as a source of income than any other single source. The low figures for the Maritimes are hardly surprising given insights from the previous chapter on farm performance in these provinces. However, to some extent these lower figures are attributable to an older population; that is, the larger proportion of persons relying on transfer payments in these provinces is attributable to a considerable extent to larger proportions of population in retirement ages.

See footnotes on page 125.

Chart 3.1

Average Census-farm Family Income from Farming, Off-farm Sources and Off-farm Employment, Canada and Regions, 1941, 1958 and 1971



(1) Unlike the 1941 and 1971 census farm definition (farm = 1 acre + \$50. sales as minimum), the 1958 survey uses the 1951 census farm definition (farm = 1 acre + \$250. sales as minimum).

Sources: 1941 Canada Census of Agriculture; 1958 Farm Survey, Report No. 2, D.B.S. cat. no. 21-509, tables 1 and 11; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

TABLE 3.1. Absolute and Relative Amounts of Census-farm Operator Families Income by Major Source of Income, Canada and Provinces, 1971

Source of income	Area				
	Canada	Newfound-land	Prince Edward Island	Nova Scotia	New Brunswick
Average income per family					
	dollars				
Total income	8,469	7,019	7,776	7,890	7,597
Total cash income.	6,935	6,019	5,857	6,440	6,000
From farming	1,857	690	1,624	986	1,048
From off-farm employment	4,158	4,277	3,330	4,421	4,015
From non-employment.	920	1,052	903	1,033	937
Income in kind	1,534	1,000	1,919	1,450	1,597
Percentage distribution of cash income by source					
Total cash income.	100.0	100.0	100.0	100.0	100.0
Share from farming	26.8	11.5	27.7	15.3	17.5
Share from off-farm employment	60.0	71.1	56.9	68.7	66.9
Share from non-employment	13.3	17.5	15.4	16.0	15.6
Average income per family					
	dollars				
Total income	9,028	10,672	7,120	7,627	8,648
Total cash income.	7,031	8,477	5,409	5,532	6,582
From farming	2,038	1,856	1,616	2,100	1,901
From off-farm employment	4,087	5,521	3,067	2,638	3,879
From non-employment.	906	1,100	726	794	802
Income in kind	1,997	2,195	1,711	2,095	2,066
Percentage distribution of cash income by source					
Total cash income.	100.0	100.0	100.0	100.0	100.0
Share from farming	29.0	21.9	29.9	38.0	28.9
Share from off-farm employment	58.1	65.1	56.7	47.6	58.9
Share from non-employment	12.9	13.0	13.4	14.4	12.2

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

TABLE 3.2. Percentage Distribution of Census-farm Family Heads, Family Members Other Than Heads, and Non-family Persons Residing in Census-farm Operator Households, Aged 15 and Over with Income by Major Source, Canada and Provinces, 1971

Area	Total number with income	Major source of income					
		Total	Wages and salaries	Farm self-employment	Non-farm self-employment	Government transfers	Retirement and pensions
	1	2	3	4	5	6	7
Part A - Heads of family							
	000's	per cent					
Canada	300	100.0	41.2	43.9	5.0	6.4	3.5
Newfoundland	1	100.0	54.2	16.8	7.4	20.0	1.6
Prince Edward Island	4	100.0	42.6	37.8	5.4	12.6	1.6
Nova Scotia	5	100.0	57.7	21.7	6.2	10.8	3.6
New Brunswick	5	100.0	54.7	24.9	6.5	11.2	2.7
Quebec	56	100.0	44.1	40.7	5.5	7.5	2.2
Ontario	81	100.0	49.8	36.0	4.7	4.7	4.8
Manitoba	29	100.0	36.0	49.7	4.5	7.2	3.1
Saskatchewan	54	100.0	24.5	62.0	4.3	6.0	3.2
Alberta	50	100.0	36.1	49.2	5.4	6.3	3.0
British Columbia	15	100.0	61.1	22.7	5.4	5.3	5.5
Part B - Census-family members, other than heads							
	000's	per cent					
Canada	556	100.0	44.6	42.0	5.1	5.3	3.0
Newfoundland	2	100.0	58.1	15.8	7.2	18.1	0.8
Prince Edward Island	8	100.0	46.5	36.0	6.0	10.0	1.5
Nova Scotia	9	100.0	58.9	22.9	7.9	8.0	2.3
New Brunswick	10	100.0	58.3	24.4	6.8	8.5	2.0
Quebec	131	100.0	50.8	36.2	5.4	5.6	2.0
Ontario	143	100.0	52.6	35.2	4.8	3.3	4.1
Manitoba	50	100.0	36.8	49.2	4.2	7.0	2.8
Saskatchewan	92	100.0	25.6	61.4	4.5	5.4	3.1
Alberta	85	100.0	37.2	48.8	5.4	6.0	2.6
British Columbia	26	100.0	63.5	22.1	5.8	4.0	4.6
Part C - Non-family persons							
	000's	per cent					
Canada	74	100.0	31.3	28.0	4.5	28.3	7.9
Newfoundland	1	100.0	30.2	9.3	4.7	53.5	2.3
Prince Edward Island	2	100.0	26.5	21.9	4.6	44.1	2.9
Nova Scotia	2	100.0	35.5	12.8	4.9	40.1	6.7
New Brunswick	2	100.0	33.7	10.6	3.0	47.0	5.7
Quebec	13	100.0	32.9	16.2	4.6	40.3	6.0
Ontario	19	100.0	34.3	20.8	4.1	29.7	11.1
Manitoba	7	100.0	25.3	36.5	4.4	25.0	8.8
Saskatchewan	14	100.0	23.7	44.6	4.5	19.9	7.3
Alberta	12	100.0	32.4	37.4	5.5	19.1	5.6
British Columbia	3	100.0	43.1	20.1	5.1	21.5	11.0

¹ Indicates less than 500.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

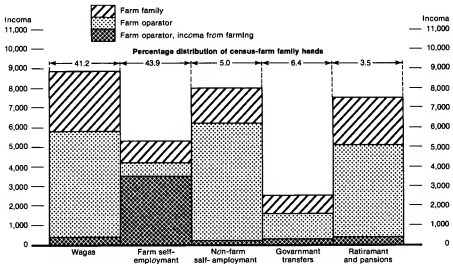
A question raised by Table 3.2 is whether we have now isolated that proportion of each province's income-earning population that is largely dependent on farming as a source of income. Do the 43.9% of farm families with heads reporting farm self-employment income as their major source still earn a substantial share of their total income off-farm? Does the reverse apply to farm family heads reporting non-farm income as a major source? Thus far, our findings certainly hint that the census of agriculture's definition of farm operator families is in for a conceptual blow as far as its utility in representing Canada's farm dependent population is concerned.

Chart 3.2 drives this point home as we see that among census-farm family heads that report wages and salaries (41.2%), non-farm self-employment (5.0%), government transfers (6.4%) and pensions, etc. (3.5%), as their major source of income, only a very small proportion of their total income derives from farming (i.e., approximately 5% - 10% reported as the operator family member's share from farming).⁴ Among operators reporting farm net self-employment as their major source of income, we also observe considerably lower levels of incomes than for those with major sources of income other than farming (see Chart 3.2).

See footnotes on page 125.

Chart 3.2

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Major Source of Income, Canada, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 3.3 graphs the income trends discussed above across provinces. The reader is advised to take particular note of these graphs as this method of presentation will be used frequently throughout this study. The utility of this approach is that it allows between-province comparisons in income levels and trends while controlling for various farm family, farm operator and farm characteristics.

Chart 3.3 yields a number of important insights into census-farm family incomes. Indeed, the information in Charts 3.2 and 3.3 introduces some of the most important material to be discussed in this inquiry. First, observe that the level of total farm operator income (FO), co-varies extremely closely with the level of farm family income (FF) among provinces for each major source. As noted above, the farm operator contribution to total farm family income is consistently the same (or nearly the same) proportion. It always represents a majority and dominates the contribution of all other census-farm family members combined. This trend will be observed in all subsequent figures of this nature.

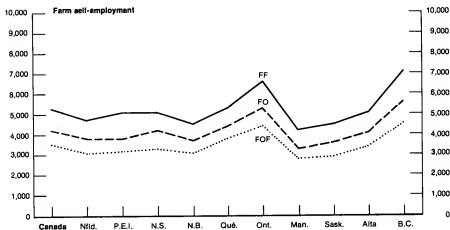
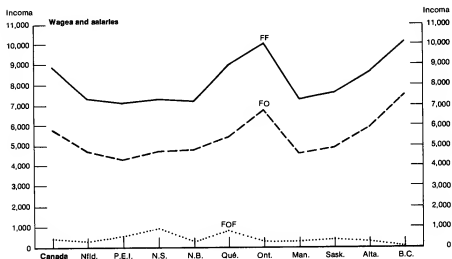
A second observation from Chart 3.3 is that dips and peaks in levels of farm family (FF) and farm operator income (FO) are always the same for provinces regardless of income source. Recall that similar dips and peaks were observed among the income ratios in Table 2.18, Part A versus B, and for the ag./non-ag. income comparisons in Chart 2.8. For example, Ontario and British Columbia always have the highest income peaks, the Maritimes the lowest. These trends will also be observed in all subsequent figures of this nature regardless of the characteristics used to disaggregate farm families.

A third observation is that farm operator income from farming (FOF) co-varies across provinces with total farm operator (FO) and farm family income (FF), only when farm families and farm operators report net self-employment farm income as their major income source. In all subsequent figures of this type, this relationship either disappears entirely or is much less apparent when other characteristics are used to disaggregate farm family income.

An important inference to be drawn from the levels and trends in Chart 3.3 is that location of a farm family, farm operator or farm in a particular province has a considerable influence on the level of income earned on farm family, farm operator and farm factor endowments. Chart 3.3 indicates that this is the case regardless of whether the source of employment income (by far the largest source of income to most census-farm families) is wages and salaries, farm self-employment or non-farm self-employment. In other terms, regional or provincial economies are operating as an important influence on attained income. In further disaggregations of income by farm characteristics, we will observe this to be the case, even when controlling for farm characteristics, etc. Thus, two-farm families with the same profile of human and non-human factor endowments are likely to earn different rates of return when located in different provinces. This implies that competition among provincial market economies is highly imperfect and that policy aimed at reducing the structural disequilibria bearing on the welfare of

Chart 3.3

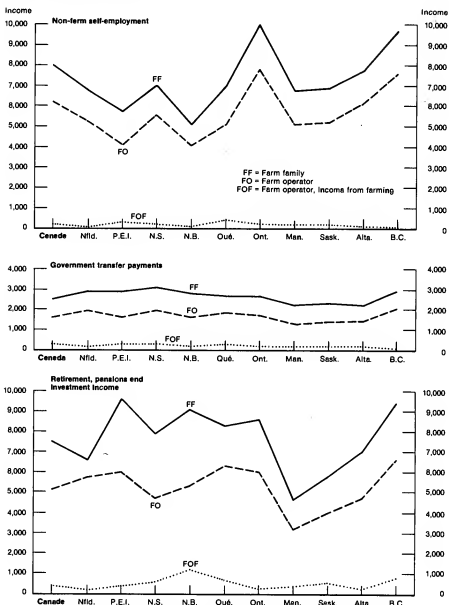
Average Total Census-farm Family and Census-farm Operator Income, and Census-farm Operator Average Income from Farming, by Major Source of Income, Canada and Provinces, 1971



FF = Farm family
FO = Farm operator
FOF = Farm operator, income from farming

Chart 3.3 (concluded)

Average Total Census-farm Family and Census-farm Operator Income, and Census-farm Operator Average Income from Farming, by Major Source of Income, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

farm families will have to sort out the extent to which various factors such as farm price support programs, urban agglomeration economics, etc., account for this "market failure".

The tendency of average total farm family and farm operator incomes to co-vary between provinces regardless of their source or the characteristics of those earning them is summarized by the correlations presented in Table 3.3 A. Even though the matrix of coefficients rests on a very small sample size of 10 provinces, values are very high and all are statistically significant at the 0.95 level. Consistency, though not always statistical significance, is also apparent when we correlate average farm family incomes among farm capital value subgroups (Table 3.3 B).

TABLE 3.3 A. Correlation Coefficient Matrix for Evaluating Association Between Total Income Levels of Various Population Subgroups

Variable	Average urban family income	Average rural non-farm family income	Average income of all persons aged 15 and over with income			Average income of all census-farm persons aged 15 and over with income			Average census-farm operator income
			Total ¹	Male	Female	Total ¹	Male	Female	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	1.00	0.86	0.91	0.92	0.95	0.74	0.70	0.88	0.73
(2)		1.00	0.84	0.85	0.84	0.86	0.87	0.85	0.93
(3)			1.00	0.99	0.94	0.88	0.83	0.89	0.83
(4)				1.00	0.93	0.88	0.84	0.87	0.84
(5)					1.00	0.75	0.70	0.95	0.74
(6)						1.00	0.99	0.79	0.97
(7)							1.00	0.74	0.99
(8)								1.00	0.99
(9)									1.00

¹ Refers to total persons versus male-female disaggregations.

TABLE 3.3 B. Correlation Coefficient Matrix of Average Farm Family Incomes of Families Within Each Farm Capital-value Class

Variable	Less than \$2,950	\$2,950 - 7,449	\$ 7,450 - 19,949	\$19,950 - 74,949	\$ 74,950 - 149,999	\$150,000 and over
	(1)	(2)	(3)	(4)	(5)	(6)
(1)	1.00	0.61	0.59	0.50	0.53	0.64
(2)		1.00	0.73	0.50	0.41	0.54
(3)			1.00	0.92	0.57	0.88
(4)				1.00	0.75	0.92
(5)					1.00	0.69
(6)						1.00

Correlation coefficient matrices have also been constructed for many other farm family and farm operator characteristics indicating, in most cases, consistency and statistical significance except in cases when very large farm operations are at issue. That is, when economies of scale are evident, returns to factor endowments seem to be conditioned less by the observed positive or negative effects of the regional economy.

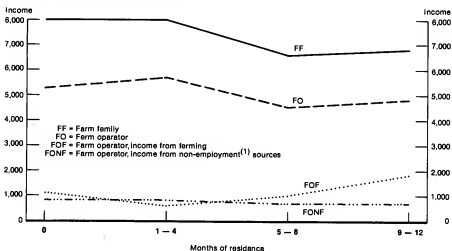
3.3. Influences of Differential Farm Family Incomes

This section makes use of the same means of presentation as in Charts 3.3 and 3.4 toward further disaggregating farm family, farm operator and farm income by such characteristics as residence, education of farm operator, etc. Thus, in our graphs FF = income of farm families, FO = income of farm operator, FOF = income of farm operator from farming, FONF = income of farm operator from non-employment sources. Our primary concern is with evaluating levels, trends and differentials in incomes in terms of a number of possible influences.⁵

See footnotes on page 125.

Chart 3.4

Average Total Census-farm Family and Census-farm Operator Income, and Average Income of Farm Operators from Farming and Non-employment Sources, by Residence, Canada, 1971



(1) Income from Government transfer payments, retirement pensions and investments.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

3.3.1. Residence

A shorter period of residence on a farm during any given year usually implies less dependence on farming as a source of livelihood. Given levels of income by major source reported in Charts 3.2 and 3.3, we would also expect less residence on farms to imply not only more non-farm occupational involvement but higher levels of earned income (i.e., a higher rate of return from off-farm than farm employment).

We have already claimed that dependency on farming as a source of livelihood is less for non-resident farm operator families than for resident farm families. For example, almost twice the proportion of non-resident farm operators (46%) report non-farm occupations as do resident farm operators. Chart 3.4 further substantiates our point; not only do we observe a decline in total farm family and farm operator income with increased residence on farms, but higher farm operator farm incomes. That non-resident operator farm families (zero months residence) appear to earn a larger proportion of their total income from farming than farm operator families who reside on farms one to four or five to eight months can probably be attributed to census double-counting. That is, as some operator families own and operate a farm in one place but reside at another (i.e., on another farm holding), they and all their farm income will be included with other non-resident operators that are "truly" marginal farmers with very little farming income.

Further details on incomes by residence classified by province are provided in Chart A.4.1 of Appendix A.4. Essentially, the more detailed presentation given in the appendix reveals the same basic income co-variation among farm family and farm operator income. Lack of co-variation for farm operator income from farming among provinces is again observed in Chart A.3.3.

3.3.2. Family Size

On average, the larger a family, the larger we would expect total family income to be and the smaller we would expect per capita income of family members to be. A larger number of family members usually implies more income earners per farm unit and therefore an over-all larger flow of income to the family. On the other hand, per capita income is expected to be lower because large family size usually implies higher dependency rates. Also, it is less likely that income earners, other than the family head, will be full-time income earners. The negative family size per capita family income relationship has been borne out in numerous socio-economic contexts even when economies of scale to consumption (e.g., cooking, passing down of clothing, etc.) are taken into consideration.

Now, for census-farm families, it is difficult to say whether the contribution of farm family members (excluding the farm operator head) to total farm family income will increase or decrease with larger family size. On the one hand, if farm family members work largely as unpaid farm family workers, they will contribute indirectly to the operator's reported net self-employment farm income (i.e., due

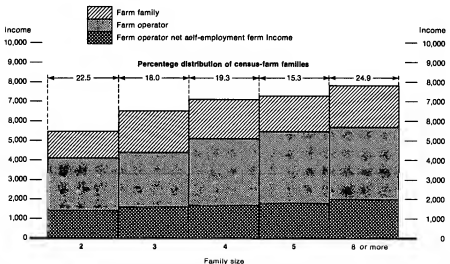
to his lower cash wage outlays). Additional farm family members could also contribute to family income through off-farm employment. Additional family members of non-working age may also act to motivate the farm operator or family head to earn more income toward supporting a larger number of dependents.

On the other hand, smaller family size may imply less supervisory responsibility for the female parent and thus more time for labour force activity. It is not inconceivable that two working parents in a two-member family will earn as much or more than a working head and two or three part-time working dependents in a four- or five-member family.

Unfortunately, our data do not allow us to disentangle the complexities surrounding the various contributors to family income. At best, data in Chart 3.5 tell us that levels of income from all sources rise with family size but that the operator's percentage contribution (i.e., both his total contribution and that originating only from farming) remains relatively constant across all family size categories. In effect, this means that an addition in family size from two to, say, six persons does not result in substantial relative increases in family member contributions. Why, then, would operator income *per se* rise with larger family size? As mentioned previously, a larger number of dependents may motivate the operator to earn more. More likely, however, large family size provides a reserve

Chart 3.5

Average Total Census-farm Family and Census-farm Operator Income, and Average Farm Operator Income from Farming, by Family Size, Canada, 1971



Sources: Statistics Canada, 1971 Census, Vol. IV.1, Table 2; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

of unpaid family labour which helps reduce farm expenditures (i.e., wages to hired labour), increases the operator's reported farm income as a result, and frees him for more off-farm work.

3.3.3. Sex of Operator Family Member and Family Ethnic Origin

Over-all, sex of the family operator member is not an important influence of farm family incomes, simply because so few farm operators are females (about 4%). As noted in Chapter 2, low incomes of the 4,500 wives that have been classified as farm operators suggest that their performance of farm duties frees their husbands for off-farm employment. Of the remaining 10,000 females classified as farm operators, their older ages (about 56 years on average, compared with 49 for male operators), their heavier reliance on non-employment income (about 40% of their total versus 14% for male operators), and similar capital value of their farms (\$58,000 for female operators, \$67,000 for male operators), suggests that a large proportion of these females are widows and/or in the "retirement" category.

Also, ethnic origin does not appear to be a major conditioner of family incomes. For example, the three major ethnic groups, British Isles (41%), French (20%) and German (14%) have total farm family incomes of approximately \$7,400, \$7,300 and \$6,900, respectively. While there is a big difference among these groups in their farm capital value (about \$73,000, \$41,000 and \$77,000, respectively), this does not bear positively, on average, on their total farm incomes; indeed, reported average net farm self-employment income is considerably lower for the "British Isles" group (about \$1,500, \$1,900 and \$1,900, respectively). (Admittedly, the poor showing of the "British Isles" group could be partly attributable to their greater concentration in the Prairie provinces where wheat farmers experienced a particularly poor year in 1970.)

Scrutiny of other ethnic groups reveals that total family income levels fluctuate more with level of operator's education and family size than with any other variable. To illustrate, the lowest farm income group is Ukrainian (6.9% of resident farm families with average family income of \$5,192). It also has the lowest combined operator education and family size (seven years, four members), while a medium-to-high income group originates from the Netherlands (4% of resident farm families with average family income \$8,026, nine years of education, five family members) and the highest farm income group is Jewish (\$12,722, 0.1% resident farm families, 10 years education, four members). Although average farm capital values do vary considerably between groups, these variations do not co-vary with net self-employment farm income. That is, income differentials between groups is related more to operator's education (and operator's off-farm employment income) and family size (and family member contributions to total family income).

3.3.4. Education of Farm Family Operator Member

In Section 2.5, we noted well-known reasons for a positive correlation between education and income. Chart 3.6 provides further support for this relationship and at the same time raises an important question. First, the figure reflects the relatively constant amount of income contributed to total farm family income by members of farm families excluding the operator, as well as the jump in total farm family income and farm operator income associated with attainment of a university degree by the farm operator family member (who is usually the family head). Reasons for this jump have also been discussed in Chapter 2. Also as education increases the importance of farming in the farm operator's contribution to income declines.

A question to be answered is why there is a negative education/farm operator/farm income relationship? At least three reasons may underlie this trend. The first is that larger proportions of farm operators with high levels of education report non-farm occupations during census week. As these operators manage farms of smaller size and expend less effort in their daily operation, there is every reason to expect their farm earnings to be low.

The second reason is the strong possibility that a larger proportion of families with highly educated operator members involved in off-farm jobs are likely to be motivated to use their farms as a tax write-off (i.e., meaning that zero or loss income would be reported towards minimizing their total taxable income).

The third reason has to do with time involved in obtaining higher education, the age of those with higher education, and the self-employment returns from a largely classical education. Higher education means delayed entry into farming and, possibly, delayed accumulation of capital as a result. At least two factors could be depressing farm incomes of younger operators, who tend to be more educated. These are the difficulty in accumulating capital, and barriers to obtaining credit to purchase larger, more profitable farming operations.

As for the self-employment return to higher education, it seems obvious that higher education levels endow one with opportunities to earn a higher rate of return at off-farm work, not only because off-farm rates of return to labour are generally higher but because the content of Canada's increasingly specialized educational system is more appropriate for employment in urban-industrialized jobs. Thus, with higher levels of education, regardless of age, we might expect less farm activity and therefore lower farm incomes.

In profiling education and income data by province (Chart 3.6), we note the low trough in net self-employment farm income (FOF) that approaches and passes zero with increased educational attainment. This suggests that higher education is positively correlated with marginal farming (and therefore low self-employment farm income), that farms are being used as a tax write-off, or that the census-farm operator is investing in farm capital and is claiming this investment as a farm loss (i.e., to cover depreciation).

Chart 3.6

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Level of Education of Family Head, Canada and Provinces, 1971

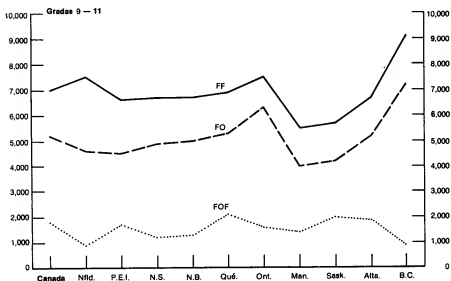
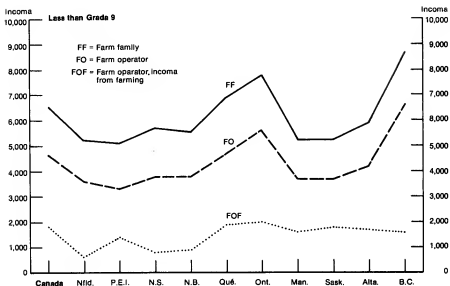


Chart 3.8 (continued)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Level of Education of Family Head, Canada and Provinces, 1971

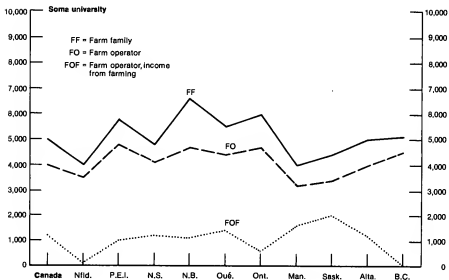
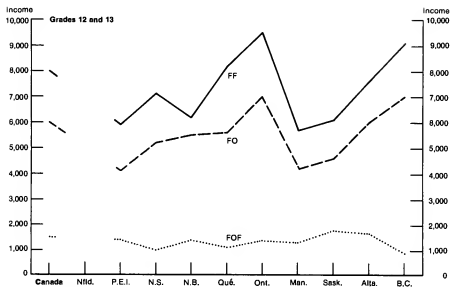
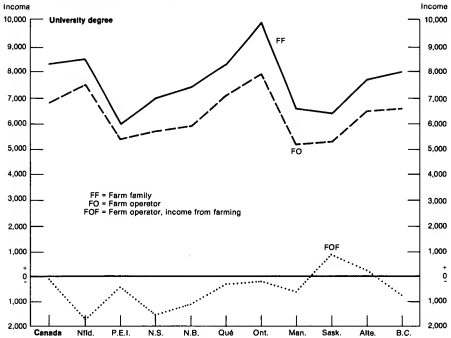


Chart 3.8 (concluded)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Level of Education of Family Head, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage

Reflecting, for the moment, on the latter possibility, does it not seem strange that farm operators "with university degree" report, on average - \$100 net self-employment farm income when their total farm capital value is about \$117,000 and their total farm expenditures, on average, are about \$115,000? If farm expenditures were small in comparison to farm capital value, we might suppose that residential dwellings and property represent most of the capital value of these operators (i.e., little working farm capital and therefore little farm income). Conversely, however, we find that the higher level of the operator's education is associated with (i) a higher ratio of farm expenditures to total capital value, (ii) lower net self-employment farm income, (iii) relatively large farms (between 450 - 600 acres - comparable to those of operators in other educational groups), and (iv) value of machinery similar to operators in lower educational groups (e.g., \$10,000 - \$14,000). All this suggests either "large scale hobby farmers" (i.e., high capital values, high expenses, yet a small or negative net return), or that farm earnings are higher than reported but that there exists a tendency to plough earnings back into farm capital stock, etc.

3.3.5. Economic Class of Farm

Economic class of farm relates to value of agricultural products sold (see Appendix A.5, Glossary of Terms), and, as such, is commonly used to describe the economic magnitude of a farm. For example, the 46.5% of Canada's 1971 census-farms which sell less than \$5,000 worth of agricultural products represent Canada's small, marginal farms; they account for only 8.1% of all farm products sold, 23.3% of total farm acreage, and 23.1% of total farm capital value. Also, their operators consume 73.1% of all farm operator days worked off-farm.

For obvious and well-established theoretical and empirical reasons, larger gross agricultural sales imply larger profits and larger farm incomes. As for the relationship between economic class of farm and total farm family or total operator income, however, there is less certainty about the strength of this sales-income relationship. As the Census of Agriculture includes all families residing on holdings of one acre or more with sales of \$50 or more per year, many of which derive most of their income from non-agricultural work, we can expect total family income levels and trends to correlate positively with economic class of farm.

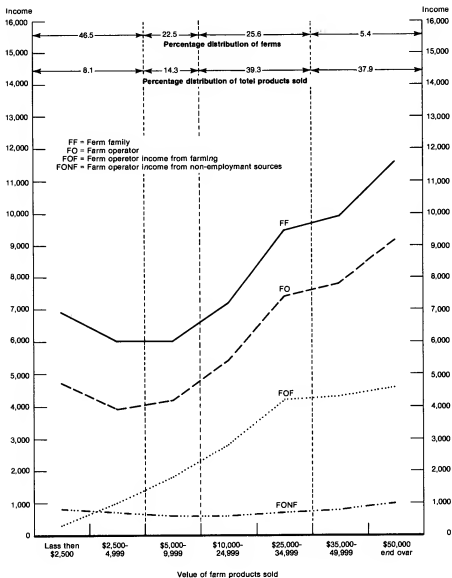
Chart 3.7 bears out our suspicions. While the upturn in farm family and farm operator income can be attributed to an upturn in net self-employment farm income, associated with higher economic class, interesting discrepancies in the relationship are apparent. For example, in the lowest economic classes (less than \$2,500 sales), total farm family and farm operator income are higher than for those in the \$3,750 - \$7,500 sales category. This might be explained by the fact that among farm operators with sales less than \$2,500, off-farm employment and accompanying incomes are higher than among farmers in the next highest sales category, where there is a slightly higher reliance on farming and, consequently, lower incomes. In other words, farm operators with farm sales in the low, but not the lowest economic classes may be worse off than the latter subgroup because they are more reliant on their inadequate farms as a major source of income.

The most interesting observation in Chart 3.7 is the levelling off of operator's income from farming for the largest sales categories, in contrast to rising total farm family income. This means that an increasing share derives from the operator's off-farm work. In the aggregate, this implies a cut-off point in positive marginal returns to farming.

Chart 3.7 also shows the level of "non-employment operator off-farm income" by economic class of farm. Generally, the absolute contribution of this income source to farm families remains relatively flat, regardless of the family or farm characteristic used to disaggregate incomes. The only difference is that government transfers are more important to incomes of marginal operators (i.e., those in the lower sales categories), whereas investment income is more important to families with farms in the higher sales categories. As absolute levels of this source of income are relatively flat across provinces (see Chart 3.8), we exclude this income component from further analysis. In the aggregate, it has been observed to behave the same no matter what characteristic is used to disaggregate incomes.

Chart 3.7

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Economic Class of Farm, Canada, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 3.8

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Economic Class of Farm, Canada and Provinces, 1971

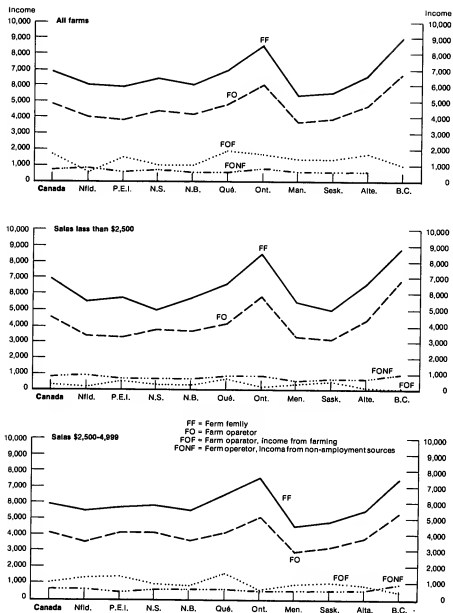


Chart 3.8 (continued)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Economic Class of Farm, Canada and Provinces, 1971

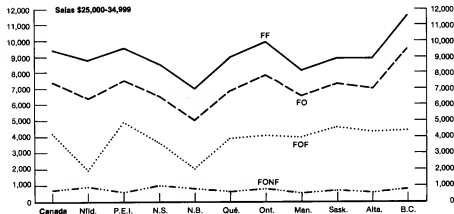
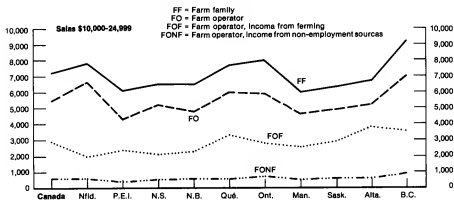
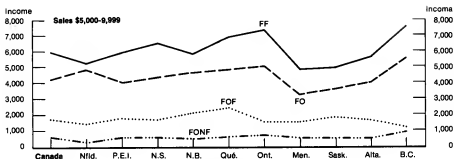
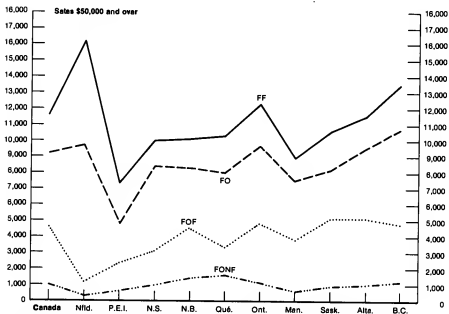
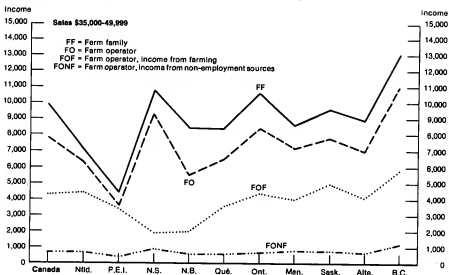


Chart 3.6 (concluded)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Economic Class of Farm, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart 3.8 shows income by province for each economic class category. Again we observe that farm family and farm operator total income co-varies, regardless of the economic class of farm. We also observe a relatively constant absolute amount of farm family income contributed by family members other than the operator. Further, we note that, with higher economic class of farm, income from farming begins to co-vary with total farm family and farm operator income across provinces. This was also observed in Chart 3.3, where major source of income was farming; this is merely to say that farms of larger economic class are more absorptive of farm operator and farm family productive talents, and that the returns to this effort become conditioned more so by regional differentials in rates of return to factors of production. Needless to say, variations are hard to explain, such as provincial differentials in income levels for farms with sales exceeding \$50,000 (see Chart 3.8).

For example, it is difficult to imagine a farm with sales exceeding \$50,000 earning only \$1,200 in net farm self-employment income, with approximately 80% of the operator's income deriving from off-farm employment. Who these farm operators are, and why levels and trends in their total farm family income do not conform to dips and peaks observed for other economic sales categories, is evaluated to some extent later. Admittedly, however, the problem requires much more probing at the microlevel than is possible in this study.

3.3.6. Capital Value of Farm

As gross farm sales and average value of farm capital are highly and positively correlated, we would expect the same relationships in Charts 3.7 and 3.8 to emerge between operator incomes and broad capital-value classes. Such is the case, but with a few important variations (the supporting data are not shown here). First, we do not observe a levelling-off of absolute net self-employment farm income with higher capital-value class as we did for economic class of farm. Even though total capital value includes value of residential dwellings, the fact remains that farm capital value pertains largely to farm inputs and we would expect that, with larger farm holdings, the profit capital-value relationship would be stronger than was observed for economic class of farm. As matters stand, economic class tells us nothing about inputs or profits. Of continuing surprise, however, is the fact that large shares of total farm family and farm operator income derive from off-farm sources in the case of members of higher capital-value categories and the off-farm contribution exceeds the farm contribution (see Chart A.4.2, Appendix A.4, for provincial data).

3.3.7. Size of Farm

As size of farm is also strongly and positively correlated with gross sales and capital value, we would again expect to see a repeat of levels and trends observed in Charts 3.7 and 3.8 in the farm income-size relationship. The data (not shown here) reveal this to be the case. There is also a dip in total farm family and farm

operator income between farms sized 10 - 69 acres and 1,600 acres and over, and about equal levels of total income attained for families with the smallest versus the largest farms.

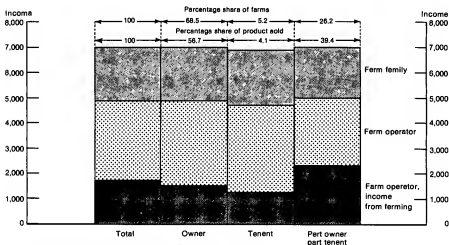
As we know that farm operators with farms one to nine acres are predominantly involved in non-farm occupations, we might be tempted to hypothesize that, on average, size economies require 1,600 acres or more to attain income returns equal to those of farm families employed largely in non-farm occupations. However, as farms of this size are typically found in the Prairies where a large proportion would be involved in the production of wheat and would have experienced a particularly bad year (see Section 2.7.2), such reasoning would be faulty. In other words, during a "normal year" we would expect total family and net self-employment farm incomes to be much higher for farms on the higher end of the size scale.

3.3.8. Farm Tenure

The importance of rented land has been increasing and there has been an over-all decline in the proportions of farm operations that were completely owned. (See footnote 5 to Chapter 1.) Rental of land, be it necessary to increase insufficient incomes from farming, or as a means of raising adequate incomes further, is expected to expand the scale of holdings toward that effect. In Chart 3.9, we observe this to be the case. On the other hand, farm family and farm

Chart 3.9

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Tenure of Farm Operator, Canada 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

operator income from all sources are nearly the same for each tenure class. Another reason for high farm income among part-owner/part-tenant farm operator families may derive from the fact that they own less fixed capital and put more labour, proportionately, into their farms than do owners (only 17.1% report off-work versus 55.0% for owners); that is, fixed capital costs to farm operation will be lower (though there would be land rental costs), while farm operator labour invested in farming would be higher.

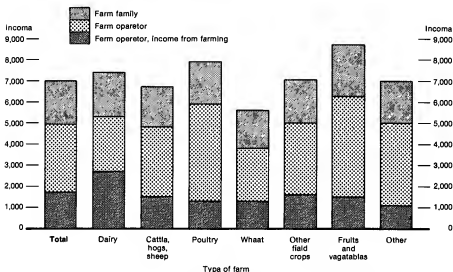
3.3.9. Type of Farm

Differentials in farm income by type of farm may or may not be expected, depending on export demand, etc., for particular types of farm products, knowledge of imperfections in the market mechanism viz. allocation of resources to their best advantage, etc. In the former case, we anticipate low returns to wheat farmers for reasons discussed in Section 2.7.2. In the latter case, if returns to one type of farming were progressively higher than another (each year after, say, 1960), farm resources could be transferred to that type. Of course, neither factors of production for different types of farming nor skills required for their operation are perfectly transferable.

As we see in Chart 3.10, the situation in 1970 favoured dairy, poultry and fruit and vegetable farms. That these farms will likely continue to be favoured is apparent from the high income elasticity of demand for meat, fruit and vegetable

Chart 3.10

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Type of Farm, Canada, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage

products. Although incomes of wheat farmers are lower for reasons cited earlier, the fact remains that, without rising export demand for wheat, Canadian agricultural policy will continue to favour reduction of wheat farms.

Another reason for higher incomes among the dairy and fruit and vegetable types may be that a large proportion of these farms are located in high income provinces (i.e., about 70% of all Canada's dairy production is located in Ontario and Quebec, whereas fruit and vegetable farming is concentrated in British Columbia). As noted previously, we shall see throughout this study that the economic prosperity of a provincial economy (as measured by levels of total family and urban family incomes) seems also to be an important "conditioner" of the level of net self-employment farm income.

Again, Chart 3.10 displays the relatively constant contribution of farm family members and operator's off-farm employment income (in excess of farm income) to total farm family income (except for dairy farms). The latter observation comes as no surprise, since presence of dairy cattle on farms demands almost constant care and therefore less prospects for earning off-farm income.

3.4. Influences of Farm Family Income Levels

3.4.1. Between Subgroup Evaluation

Thus far, differentials in total farm family income have been evaluated according to a number of select farm family and farm characteristics. On the basis of highly aggregative analysis, total farm family income appears to be positively related to:

- (a) location in certain provinces as against others;
- (b) non-farm residence;
- (c) larger family size;
- (d) higher level of operator's education;
- (e) higher economic class of farm;
- (f) higher capital value of farm; and
- (g) certain types of farms.

Over-all, farm location, off-farm income as a major source, family size, economic class of farm, capital value of farm and various types of farms stand out as being not only strongly and positively correlated with total farm family income but significant for a large majority of census-farm families. There is less certainty about the importance of residence and education for Canada's census-farm population as a whole. As for farm size and tenure, there seems to be little or no relationship with levels of total farm family income.

How these findings stand up at the small-area level is the question for the balance of this section. Our interest in pursuing this question is to identify characteristics consistently associated with low versus high farm family incomes. By low farm family income, we rely on the low-level income cut-off developed by Statistics Canada (see Chapter 2, Section 2.7) of approximately \$4,000 cash income for a rural farm family.

TABLE 3.4. Percentage Distribution of Families by Total Family Income, Canada, Urban, Rural and Census-farm, 1971

Income group	Total	Urban	Rural	Census-farm
Total	100.0	100.0	100.0	100.0
Less than \$2,000	5.5	3.9	10.7	15.2
\$ 2,000 - \$ 4,999	17.2	13.8	29.0	30.9
5,000 - 9,999	38.3	38.6	37.5	32.2
10,000 - 14,999	24.8	27.6	15.4	12.8
15,000 - 19,999	8.3	9.5	4.3	4.5
20,000 and over	5.5	6.3	2.8	4.2
No income reported	0.3	0.3	0.3	0.2
Number of families 000's	5,076	3,930	1,146	304
Average family income \$	9,600	10,298	7,209	6,939

Source: Statistics Canada, 1971 Census, Bulletin AH-4, Catalogue 93-746, Table 1; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

One way of evaluating this question is to juxtapose mean values for select farm family, farm operator and farm characteristics of families with (i) per capita incomes below levels implied by the low-level income cut-offs, and (ii) per capita incomes at the high end of the income continuum. To this end, Table 3.5 compares low versus high income groups at the census division level. In the case of the low income group, we use \$1,400 per capita towards including a larger number of census divisions. (The precise figure should lie somewhere around \$4,000 divided by 3.9 family members, i.e., around \$1,000.) For similar reasons, \$2,500 per capita was chosen for the high income group as (a) it permitted inclusion of a similar number of census divisions for comparisons, and (b) \$2,500 times four family members implies a total family income of \$10,000 which is definitely at the high level of the farm family income continuum. Thus, in the low income group there are 41 census divisions representing about 45,000 farms and in the high income group there are 35 census divisions representing about 43,500 farms; these are listed in footnote 1 of Table 3.5, and can be located geographically using the index map in Appendix A.6.

TABLE 3.5. Income Characteristics of Census-farm Population Aged 15 and Over by Sex, for Two Clusters of Census Divisions,¹ One Low and One High Income, 1971

Item	Average per capita income		Ratio 1/2
	Less than \$1,400 1	Greater than \$2,500 2	
Male:			
Average income	3,350	5,950	0.56
Median income	2,716	4,717	0.58
Ratio of average income to median income	0.81	0.79	1.03
Female:			
Average income	1,778	1,817	0.98
Median income	1,231	1,321	0.93
Ratio of average income to median income	0.69	0.73	0.95
Ratio census-farm average male income to urban average male income	0.67	0.84	0.80
Ratio census-farm average female income to urban average female income	0.75	0.81	0.93
Ratio census-farm male median income to urban male median income	0.63	0.76	0.83

¹ Census divisions used in this table:

(a) Per capita income of family members less than \$1,400:

Newfoundland: Census Division Nos.: 2, 4, 7, 8, 9.

Nova Scotia: Census Divisions: Digby, Shelburne.

New Brunswick: Census Divisions: Carleton, Kent, Madawaska, Victoria.

Quebec: Census Divisions: Arthabaska, Beauce, Bellechasse, Bonaventure, Dorchester, Frontenac, Gaspé-Est, Îles-de-la-Madeleine, Kamouraska, Labelle, Lac-St-Jean-Est, Lac-St-Jean-Ouest, L'Islet, Lotbinière, Matapédia, Mégantic, Rimouski, Rivière-du-Loup, Témiscamingue, Témiscouata.

Manitoba: Census Division Nos.: 10, 11, 12, 13, 15, 18.

Saskatchewan: Census Division No. 9.

(b) Per capita income of family members greater than \$2,500:

New Brunswick: Census Division: St. John.

Quebec: Census Divisions: Chambly, Québec.

Ontario: Census Divisions: Brant, Elgin, Essex, Frontenac, Grenville, Halton, Kent, Lennox & Addington, Middlesex, Muskoka, Niagara, Ontario, Ottawa-Carleton, Peel, Thunder Bay, Toronto, Wentworth, York.

Alberta: Census Division No. 9.

British Columbia: Census Divisions: Alberni-Clayoquot, Capital, Central Fraser Valley, Cowichan Valley, Dewdney-Alouette, East Kootenay, Fraser-Cheam, Greater Vancouver, Kitimat-Stikine, Nanaimo, Powell River, Sunshine Coast, Thompson-Nicola.

Source: Statistics Canada, 1971 Census, Vol. III.1, Table 29; and 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Consider the income characteristics of each group as presented in Table 3.5. On average, the low income census divisions (hereafter the L group) have just over half the average and median income of census-farm male income earners as do the high income census divisions (hereafter the H group). The ratio of average and median male income indicates that inequality is somewhat higher among the L group.

Surprisingly, average and median female incomes are almost the same for the two groups. This finding agrees with a previous finding that farm family member contributions to total farm family income are relatively constant regardless of the socio-economic characteristics used to disaggregate farm families (see previous section). The reason for the between-group female equality versus the male inequality is likely related to females in both groups working predominantly for wages and salaries with relatively equal rates of return. Also, a larger proportion of males in the L group work full-time on farms, where average earnings are below those of males in the H group (a large proportion of which works at non-farm occupations). This interpretation begs the question as we have not, as yet, established that a larger share of the H group males work at off-farm jobs. Such will soon be demonstrated.

As far as income inequality within census divisions is concerned (Table 3.5), comparison of male farm family member income of the L group with male urban family member income of the same census divisions reveals L group members are worse off than their counterparts in the H group. At the same time, however, income inequality measured in this way is not as great between the L and H groups. This is just another way of saying that low income farm families in census divisions of the L group are also associated with low urban family income in the same census divisions.

Turning to Table 3.6, we find additional support for the "correlates" of farm family income noted above. That is, census divisions with higher total farm family income are associated with:

- (a) lower proportions of farm income as a major source of family income;
- (b) higher agricultural sales;
- (c) higher capital value of farms;
- (d) lower family size (just the inverse of the previously observed family size-income relationship);
- (e) higher level of education of farm operator member;
- (f) greater number of hens per farm (i.e., poultry farms);
- (g) greater number of days of off-farm work (also, support for (a) above); and
- (h) higher proportion of farm operators with off-farm occupations (also support for (a) and (g) above).

In comparison with (a) above, (b) and (c) may seem contradictory. However, it should be borne in mind that meeting condition (a) does not preclude meeting condition (b).

TABLE 3.6. Average Farm Family, Farm Operator and Farm Characteristics of Two Clusters of Census Divisions,¹ One Low and One High Income, Canada, 1971

Variables	Farm operator families - Average per capita income		Ratio 1/2
	Less than \$1,400	Greater than \$2,500	
	1	2	3
Part A			
A. Farm characteristics:			
1. Average agricultural sales.	6,355	13,896	0.46
2. Average capital value.	1,561	87,950	0.36
3. Average value of farm expenditures.	3,185	6,143	0.52
4. Average number of hens.	248	531	0.47
5. Average ratio 1971 to 1966 census-farms.	0.72	0.80	0.90
B. Farm operator characteristics:			
6. Average total income.	3,896	7,202	0.54
7. Average number of days off-farm work.	48	86	0.56
8. Average percentage with non-farm occupation.	34	45	0.76
9. Percentage working less than 39 weeks per year.	31	13	2.38
10. Percentage with less than Grade 9 education.	75	55	1.36
C. Farm family characteristics:			
11. Average total family income.	5,637	10,258	0.55
12. Average per capita income.	1,250	2,849	0.44
13. Average family size.	4.5	3.6	1.25
14. Average percentage of families with farm income as major source.	62	12	5.17
15. Average percentage of families residing close to urban areas.	17	74	0.23
16. Average percentage of families with less than \$5,000 total income.	56	27	2.07
17. Average percentage of families without flush toilet in their dwelling.	21	9	2.33
18. Average percentage of families with cold or no piped water in their dwelling.	28	8	3.50
19. Average percentage of families with dishwasher in their dwelling.	37	49	0.76
20. Average percentage of family income deriving from farming.	23	13	1.77
Part B			
Variables with values of particular note:			
21. Average farm family income from farming.	1,309	1,340	0.99
22. Average area of family farms in acres.	257	222	1.16
23. Average area under crops in acres.	32	41	0.78
24. Average number of cattle per farm.	25	27	0.93
25. Average area fertilized in acres.	23	19	1.21
Total number of census divisions.	41	35	...
Total number of farms represented.	45,162	43,512	...

¹ See footnote 1, Table 3.5.

... Figures not appropriate or not applicable.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from Agriculture-Population Linkage.

Two additional associations to be noted are that a larger proportion of farm operators work fewer than 39 hours per week for the L group and a considerably larger proportion of census divisions in the H group are located near a census division with a large urban area. The former variable serves as a measure of underemployment surrogate and may also be indicative of operators in the retirement category. This variable is consistently highest where incomes are lowest (namely, in the Maritimes). The latter variable reflects proximity to larger labour markets and less cost of transportation of farm products. To measure urban proximity, maps were used to determine if each census division included an urban area of at least 25,000 or if it was adjacent to a census division with a census metropolitan area.

How do we interpret the importance of the urban proximity variable? Recalling our previous observations on consistent peaks and dips in farm family incomes, urban family incomes, etc., for provinces, we speculated that "imperfect markets", urban agglomerations, etc., could be behind the large between-province variations in incomes. At the same time, however, we acknowledge that most of these considerations are outside meaningful measurement as well as the scope of this study. Accordingly, our urban proximity variable is but a crude attempt to evaluate the bearing of urban agglomerations on small-area family income levels. As for the "why's" of the positive relationship between the two variables, we can only speculate that proximity to an urban centre implies (i) greater opportunities for off-farm work for both the farm operator and members of his family; (ii) higher wage and salary levels to urban than rural off-farm jobs due to greater prevalence of unions, greater labour productivity, etc. (which affects incomes directly as well as indirectly in the demand supply market for labour); and (iii) possibly lower costs of transporting agricultural goods to local markets, etc.

Confirmation of the relationships discussed is again apparent in Table 3.6, Part B. There appears to be little difference in size of farm between the L and H groups, and average farm family income from farming is about equal. In many respects, the latter finding indicates that a major differential between the two groups lies in the ability to earn "off-farm income". In fact, if we recall the large proportion of off-farm employment income contributed by the operator to total farm family income regardless of various measurements of farm magnitude, this interpretation makes sense.

3.4.2. Regression Analysis Underpinnings

Thus far, we have examined the factors likely to be correlated with total farm family income. We now consider interaction of possible influences in total farm family income.

In the correlation and regression analysis to follow, 252 census divisions are used as units of analysis. Initially, averages for 53 independent variables were calculated (see Table 3.7, footnote 1), many of which were expected to be co-linear but were chosen in an effort to identify the best predictors of farm

TABLE 3.7. Simple Correlation Coefficient¹ for Select Census-farm Family, Census-farm Operator and Census-farm Characteristics, Canada and Contrived Regions, 1971

Independent variables ²	Canada	Mid-west	Mid-east	East
A. Farm characteristics:				
1. Average agricultural sales	0.32	0.57	0.44	0.20
2. Average capital value	0.44	0.68	0.69	0.42
3. Percentage fully owned	0.06	- 0.32	- 0.41	- 0.04
4. Average number of cattle	0.00	0.43	- 0.27	0.41
5. Average number of hens	0.25	0.10	0.24	0.12
6. Percentage of area rented	0.15	0.48	0.49	0.14
7. Average number of tractors	0.16	0.21	0.23	0.32
8. Percentage of meat farms	0.27	0.23	0.36	0.48
B. Farm operator characteristics:				
9. Average number of days off-farm work	0.43	0.43	0.41	0.27
10. Percentage with non-farm occupation	0.33	0.34	0.28	0.22
11. Percentage with off-farm income	0.41	0.43	0.27	0.46
12. Percentage of total income from farming	- 0.26	- 0.34	- 0.27	0.11
13. Percentage with less than 75% of total income from farming	0.42	0.48	0.43	0.01
14. Percentage working less than 39 weeks per year	- 0.28	- 0.35	- 0.19	- 0.63
15. Average total income	0.95	0.98	0.94	0.91
C. Farm family characteristics:				
16. Major source of income (dummy: 1 = farm, 2 = non-farm)	0.32	0.47	0.36	0.05
17. Urban proximity (dummy: 1 = not close, 2 = close)	0.42	0.25	0.38	0.43
18. Percentage of family income contributed by farm operator from farming	- 0.25	- 0.29	- 0.26	0.09
19. Percentage of heads of family with less than Grade 9 education	- 0.25	- 0.70	- 0.50	- 0.50
20. Percentage of heads of family with more than Grade 12 education	0.25	0.73	0.43	0.21

See footnote(s) at end of table.

TABLE 3.7. Simple Correlation Coefficient¹ for Select Census-farm Family, Census-farm Operator and Census-farm Characteristics, Canada and Contrived Regions, 1971 - Concluded

Independent variables ²	Canada	Mid-west	Mid-east	East
D. Other:				
1. Average size of farm	- 0.28	0.36	- 0.30	0.36
2. Average crop area	- 0.17	0.01	- 0.16	0.29
3. Percentage of operators aged 44 or less	0.07	0.18	- 0.02	- 0.07
4. Average operator income from farming	- 0.01	0.01	- 0.07	0.45
5. Average family size	0.01	0.19	- 0.39	- 0.03
N = number of census divisions considered	252	53	155	44

¹ All data transformed Log-normal Scale previous to correlation and regression analysis.

² A list of the 53 variables considered follows. Some of these variables are presented in the present table and others are presented in later chapters:

A. Farm variables:

1. Percentage of farms with sales of less than \$5,000
2. Ratio of census-farm in 1971 to same for 1961
3. Percentage of farms of less than 70 acres
4. Average capital value
5. Average size
6. Percentage of area under crops
7. Average crop area
8. Average area fertilized
9. Average number of cattle
10. Average number of hens
11. Average paid labour
12. Average sales
13. Percentage of area rented
14. Average number of tractors
15. Average value of machinery
16. Average cash wages paid
17. Average taxes paid
18. Average rent paid
19. Average feed purchases
20. Average fuel and oil costs
21. Average fertilizer cost
22. Average total expenditures
23. Percentage of meat farms.

B. Farm operator variables:

1. Percentage non-resident
2. Percentage owners
3. Average off-farm work
4. Percentage with zero or less farm income
5. Percentage with less than 50% of income from farming
6. Percentage with less than 75% of income from off-farm employment
7. Average employment income
8. Percentage stating non-farm occupation
9. Percentage with wages and salaries
10. Percentage with off-farm income
11. Percentage immigrants
12. Major source (dummy: 1 = farm, 2 = non-farm)
13. Percentage with less than Grade 9 education
14. Percentage with more than Grade 12 education
15. Percentage working less than 39 weeks per year
16. Percentage working less than 40 hours per week
17. Average total income
18. Percentage aged 44 or less
19. Average farm income
20. Percentage of total income from farming.

C. Farm family variables:

1. Urban proximity (dummy: 1 = not close, 2 = close)
2. Per capita family income
3. Average family size
4. Percentage without flush toilet in their dwellings
5. Percentage with cold or no piped water in their dwellings
6. Percentage with clothes dryer in their dwellings
7. Percentage with dishwasher in their dwellings
8. Ratio of farm family income to CMA family income
9. Percentage of families with income of less than \$5,000
10. Percentage farm operator contribution to total family income.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

family income among clearly co-linear variable subsets. For example, averages for "farm capital value", and "value of machinery" or "farm size" and "area under crops" were calculated realizing fully well that the variables overlap conceptually.

Although choice of each variable (or variables relating to the same general concept) has been guided by theoretical underpinnings, our approach is clearly more exploratory than one directed by a well-developed body of theory. Accordingly, our objective is to identify broad patterns and underlying structure.

Of the 53 independent variables, 20 qualified for the regression analysis because (i) signs of their correlation coefficients were generally consistent for Canada's 252 census divisions and three regional subgroups of subdivisions; and (ii) correlations for the four geographical units were largely statistically significant at the 0.90 level. Table 3.7, Part A, lists these variables and gives signs of their correlation coefficients for Canada and the three subregions. Footnote 1 of Table 3.7 lists all variables considered, many of which are presented in later chapters.

The mid-west region consists of 53 census divisions in the provinces of Alberta, Saskatchewan and Manitoba; the mid-east region consists of 155 census divisions of Ontario, Quebec and British Columbia; the eastern region consists of 44 census divisions of Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick. British Columbia has been lumped with Ontario and Quebec for the simple reason that it is a high income province (like Ontario and, to some extent, Quebec) and has a farm structure more like Ontario and Quebec than the Prairies or the Maritimes.

Correlations are given for each region, as there are vast differences in the farm characteristics of each. Also, regressions for each region have been performed toward controlling for differential effects of more prosperous regional economies on levels of farm family income. The reader will recall that location of farm families in British Columbia and Ontario as against Prince Edward Island and Nova Scotia, for example, appears to be an important independent influence on the level of farm family income itself.

In general, the correlation coefficients in Table 3.7 substantiate findings reported previously. Changes of sign are observed for some variables between regions, due to differences in the organization of farm activity. For example, the prevalence of some types of farms will differ according to their location as will their size, etc. Over-all, variables bearing most on level of farm family income include :

- (a) higher economic class of farm (Variable 1 in Table 3.7);
- (b) higher capital value (2);
- (c) greater emphasis on meat production (8) (i.e., proportion of farms that are cattle, poultry and livestock combination types), number of cattle (4), and number of hens (5);

- (d) greater rental of farm land (6) and proportion of farms totally owned (3);
- (e) more days of off-farm work by the operator (9), presence of off-farm occupation (10), or off-farm income as a major source (16);
- (f) higher education of operator (19, 20);
- (g) closer proximity to urban centres (17); and
- (h) lower share of total farm family income originating from farming (18).

Although size of farm is positively associated with total family income in the mid-west (Prairies) and the east (Maritimes), the negative correlation for the mid-east may lie in poor returns to farming and poorer off-farm work opportunities in the region of the Ontario Shield. When size effects are represented by average crop area, the correlation coefficients fall below levels of statistical significance for all areas but the east. Given the absence of any apparent relationship between farm size and total family income in our previous analysis (including the very poor performance of farm size in accounting for historical variations in farm production in Appendix A.3), it seems reasonable to exclude this variable from our regressions.

Results of Table 3.7 also convey little association between farm income of the family operator member and total farm family income, in contrast to the consistently strong positive correlation between average total farm operator income and total farm family income. The latter case is further proof that the farm family operator always contributes a relatively constant proportion to total farm family income.

The relative importance of potential influences in total farm family income is evaluated by using multiple stepwise regression techniques. All data have been log-transformed (to base 10) previous to regression towards reducing any problems of non-linearity and for purposes of interpreting regression coefficients as rates of change or elasticities.

Total farm family income (FFY) is expressed as a function of sets of farm (F), farm operator (FO) and farm family (FF) factor endowments, as in Equation (1);

$$(FFY = f(F, FO, FF), (\partial FFY/\partial F, \partial FFY/\partial FO, \partial FFY/\partial FF) > 0, \quad (1)$$

Where an increase in the quantity or quality of each "endowment subset" is expected to bear positively on the flow of total cash income to farm families. At the right of Equation (1), change in F (i.e., ∂F), or in FO or FF, is hypothesized to result in a positive change in total farm family income FFY (i.e., ∂FFY) greater than zero (i.e., >0) as against a negative change (i.e., <0).

The influence of the F subset on FFY is represented by four variables;

$$F = g(KV, O, M) \quad (\partial F/\partial KV, \partial F/\partial M) > 0, \quad (\partial F/\partial O) < 0, \quad (2)$$

where:

KV = capital value of the farm;

O = per cent of farms that are completely owned;

M = per cent of farms that are cattle, hen or livestock combinations (hereafter, "per cent of meat farms").

These variables have been chosen from the list in Table 3.7, on the following grounds:

1. KV is a good surrogate of farm holdings and magnitude of operation. It is positively correlated with average agricultural sales (see correlation coefficient matrix in Table 3.8), farm expenditures, number of tractors and most other indicators of scale. Thus, the larger the farm KV, the higher we would expect family income from farming to be. There are, however, at least two shortcomings in using this variable. First, it includes accumulated wealth which may not be used in the production of agricultural goods and services in any given year. Second, it is a stock concept whereas farm family income from agriculture is a flow concept.

The most logical alternative to using capital value would be "agricultural sales" or "farm expenditures". Although both of these concepts are somewhat more closely related to operator's net self-employment farm income than is farm capital value, neither is as highly related to total farm family income as is capital value. Thus, in the interests of maximizing the predictive capacity of our regressions without seriously misrepresenting the theoretical construct at issue, we choose to use capital value. An additional benefit in using KV is that it represents not only means of generating income from production and sale of agricultural goods but means of generating rental income from land and machinery.

2. Given higher income elasticity of demand for meat than other farm products with rising incomes, we would expect that meat-producing farm families would be in a more favourable position to earn higher farm incomes than non-meat-producing farms.

3. Just as a proportion of farm land rented is strongly and positively correlated with capital value and agricultural sales, full ownership is negatively associated with levels of farm income. In the former case, rental implies motivation to expand farm holdings toward increasing farm income. This hypothesis is certainly supported in our historical evaluation of influences in the volume of agricultural production per farm. (See Chapter 1, footnote 5.)

The second set of factors in Equation (1) pertains to assets of the farm family farm operator; variables selected from Table 3.7 for this subset are:

$$FO = h(D, E_9, E_{12}), \quad (\partial FO / \partial D, \partial FO / \partial E_{12}) > 0, \quad (\partial FO / \partial E_9) < 0, \quad (3)$$

where:

MS = a dummy variable for major source of total family income with
1 = farming, 2 = non-farm,

UP = a dummy variable for proximity to urban areas with 1 = not close,
2 = close,

FS = family size,

OFS = operator's farm contribution to total farm family income.

In support of our choice of these variables, consider the following:

1. Although the major source of farm family income is positively correlated with operator member's "days of off-farm work", it is included as a means of dividing farm families into two groups, one of which will include about 20% of farm families with pensions, etc., as a major source of income. Since, non-operator members contribute to total family income they, in combination with the operator's off-farm earnings, may render the family less dependent on farming than on non-farm economic activity.

2. Urban proximity (UP) is included for the same reasons as advanced in Section 3.4.1. Also, UP would seem particularly relevant to opportunities for females to secure employment.

3. Family size (FS) can be expected to influence total farm family income positively if (i) production is largely labour-intensive in a self-employed business or (ii) if family members, other than the farm operator, contribute to total family income. However, it does not necessarily follow that larger families will have larger total family incomes than smaller families. Obviously, other productive assets enter the income equation. For example, smaller families are usually characterized by higher levels of education of the family head, which in turn is often associated with greater income-earning capacity and more opportunities for off-farm employment for wives. This implies that smaller family size will be associated with families that have higher income-earning power. Nevertheless, if all else is held constant, total farm family income can be expected to be positively related to number of family members.

3.4.3. Regression Analysis: Results

The over-all equation for estimation is

$$\begin{aligned} \text{Log FFY} = & a + b_1 \log KV + b_2 \log M - b_3 \log 0 + b_4 \log D + b_5 \log E_{12} \\ & - b_6 \log E_9 + b_7 MS + b_8 UP - b_9 \log OFS + b_{10} \log FS. \end{aligned} \quad (5)$$

Results are presented in Table 3.9 for Canada and each of the three regions.

Variables which demonstrate neither consistency of sign nor statistical significance for two or more census division aggregations have not been reported in Table 3.9. In general, the equations for Canada and the mid-west represent our best fit regression, though the F ratio for Canada is almost double.

TABLE 3.9. Selected Results of the Regression Analysis¹ of Family Income, Canada and Contrived Regions,² 1971

Independent variables and symbol	Regression coefficient	Standard error of the regression coefficient	Regression coefficient	Standard error of the regression coefficient
	Canada		Mid-west	
Owners O	0.182	0.052	0.127	0.066
K. value KV	0.315	0.025	0.406	0.076
Off-farm work D	0.215	0.042	0.203	0.072
Less than Grade 9 education Eq	0.072	0.018	0.063	0.103
Urban proximity UP	0.059	0.026	0.008	0.042
Average family size FS	0.416	0.079	0.201	0.216
Percentage of farms producing meat M	0.050	0.012	0.055	0.030
Farm operators' contribution from farming OFC	0.032	0.018	0.089	0.038
Intercept	2,103		1,762	
R ²	0.70**		0.88**	
F	56.787		32.00	
Number of census divisions	252		53	
	Mid-east		East	
Owners O	0.104	0.091	0.129	0.410
K. value KV	0.202	0.032	0.256	0.127
Off-farm work D	0.119	0.033	0.265	0.119
Less than Grade 9 education Eq	0.029	0.053	0.100	0.028
Urban proximity UP	0.068	0.029	0.037	0.104
Average family size FS	0.242	0.093	0.507	0.221
Percentage of farms producing meat M	0.020	0.023	0.037	0.023
Farm operators' contribution from farming OFC	0.036	0.020	0.024	0.077
Intercept	3,003		1,834	
R ²	0.64**		0.61**	
F	29.91		6.52	
Number of census divisions	155		44	

¹ ** = Significant at 10% level.² See Chapter 3, Section 3.4.2 for definitions of contrived regions.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Importance of variables at the regional versus the Canada level is largely attributable to differences in organization of farming and effects of regional economies. In interpreting results of Table 3.9, it should be kept in mind that the significance of each variable in the regression is indicated by size of its standard error and size of the regression coefficient. The regression coefficient should be at least two times its standard error to be statistically significant.

Findings reported in Table 3.9 indicate the following:

1. F ratios for each equation are statistically significant at the 0.01 level. Statistically, R² values are satisfactory.

2. For Canada as a whole (N = 252) all variables take on the expected sign. Capital value (KV) and days of off-farm work (D) account for the largest share of

the variance in farm family income (FFY). Both have a relatively high regression coefficient and low standard error for the mid-west region and mid-east, but less for the eastern region.

3. The variables of average family size (FS), proportion of farm operators that are owners (O), urban proximity (UP), and proportion of farm operator's contribution to total farm income (OFC) consistently demonstrate the expected sign for Canada and the regions.

4. The variables to do with farm operator education (Eg) and proportion of farms in the business of producing meat (M) each take on the expected sign for Canada and two regions. However, standard errors of the regression coefficients are acceptable only for Canada and the eastern region for Eg and only for Canada for M.

5. Judging our findings in terms of (i) the ratio of regression coefficients to their standard errors and (ii) findings among regions, leads to the conclusion that the farm component (F) of Equation (1) as represented by capital value (KV) is somewhat more useful in accounting for variations in total farm family income than is the FO component as represented by days of off-farm work (D). In contrast, the farm family component (FF) as represented by average family size and urban proximity is least significant.

As for policy implications, our regression results provide few guidelines. About all that can be said at this juncture is that there seems to be a close trade-off between investment in capital stock toward increasing income from farming and the development of off-farm work opportunities toward increasing off-farm employment revenues. As for the remaining variables, it is difficult to evaluate exactly what the trade-offs might be. In the former case, KV and D are more elastic (though still relatively rigid); in the latter case only FS is relatively elastic but suffers from a lack of statistical significance in the regressions. For example, the education profile of operators is more pertinent to off-farm employment opportunities of operators than to raising farm incomes.

Urban proximity is also a measure of availability of off-farm work opportunities for the farm operator and members of his family, higher wages and salaries at off-farm work and lower farm transportation costs. However, moving farm families closer to urban centres or vice versa as a means of stimulating higher incomes hardly seems to be a viable policy directive.

Possibly, proximity to urban agglomerations has more to do with off-farm work opportunities of farm family members (exclusive of the operator) and levels of remuneration to urban based off-farm work than to availability of off-farm work to operators *per se*. That is, Table 3.8 reveals a considerably higher $r = 0.42$ between UP and "average total farm family income" than between UP and farm operator "days of off-farm work", "percentage with non-farm occupation", etc. It could also be that the low correlations for the latter variables derive from too high a cut-off for measuring UP (i.e., population centre of 25,000 and over).

Although the tendency to expand farm holdings through rented land or the shifting of production goals toward more emphasis on meat production would appear to make historical and theoretical sense, both imply increased farm operator involvement in farming (and therefore less availability of off-farm work-time), with little promise of a significant impact on FFY.

Frankly, regression analysis of total farm family incomes is more relevant to understanding the structural aspects of Canada's farm sector than to the behaviour of the farm family production function. As the following chapters pursue the structural versus productive aspects further, speculation on farm versus non-farm influences in income earning power are reserved for a later time.

3.5. Is the Family Farm on its Way Out?

On more than one occasion in this chapter, the Census of Agriculture definition of a census-farm has been criticized on the grounds that it fails to effectively identify that share of Canada's population that is largely dependent on farming as a means of livelihood. Indeed, we have shown that less than half of Canada's census-farm families earn their major source of income from farming, that a large share of Canada's farm operators work off-farm, that less reliance on farming is very closely associated with small, marginal farm operators, and that a small share of Canada's farms is assuming an increasingly important role in production of total agricultural products.

In effect, these trends reflect the "industrialization" of farming, as a result of which farming is becoming increasingly competitive, with increasing emphasis on economies of scale, increased quantity of capital stock, improved managerial skills and continual adoption of new technology as a means of dodging the ever-present cost-price squeeze.

What is unclear, however, is whether these trends are signifying doom of the family farm. Are the reduction in small-farm numbers and the shift in sources of income among many census-farm families testimony to the collapse of the family as a unit of management in farming? Is the family really an adequate unit of analysis when comparing returns to self-employment farm activity? Possibly, it would have been better to approach our evaluation of farm family incomes by first focusing on farm corporations, etc.

To evaluate these questions, let us first define what we mean by a family farm:

The family farm is a primary agricultural business in which the operator is a risk-taking manager who, with his family, does most of the farm work and performs most of the managerial activities.

According to this definition, criteria such as size, sales, acreage or capital investment do not appear adequate for evaluating whether a census-farm is a

family concern. Rather, it would seem more appropriate to address the extent of farm ownership, economic self-sufficiency, amount of family versus hired labour and over-all restriction of managerial prerogative. With this in mind, consider the following:

1. **Farm ownership** — Of Canada's some 366,000 census-farms, 91.8% are operated by private individuals, 1.9% as incorporated farm businesses, 5.7% as partnerships and 0.6% as other farms. Institutional farms remained constant at 0.2% between 1961-71. Their share of total gross agricultural sales was 79.8%, 6.0%, 10.5% and 2.3% respectively. Institutional farms contributed 0.4% to total agricultural sales. Close to 90% of all census-farms were operated by family units.

TABLE 3.10. Census-farms by Weeks of Paid Labour and by Economic Class of Farm, 1971

Year	Total	Economic class of farm			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
1971 1961 1971 1961 1971 1961 1971 1961	Percentage of farms reporting any paid labour				
	35.4	15.1	26.0	35.9	59.5
	38.1	22.5	38.2	53.8	79.6
	Average number of weeks of paid labour, total farms				
	10.5	2.2	2.5	4.9	26.9
	10.0	2.8	5.1	10.7	52.5
	Average number of weeks of paid labour, farms reporting paid labour				
	29.6	14.2	9.4	13.6	45.2
	26.2	12.3	13.3	20.0	67.0

Source: Statistics Canada, 1971 Census, Vol. IV.1, Table 26.

2. Farm versus hired labour – In 1971, approximately 5.4% of Canada's census-farms had paid year-round labour as against 6.1% in 1961; in 1971 the average number of paid year-round labourers on all census-farms was 0.10 as against 0.11 in 1961; in 1971 approximately 35.4% of Canada census-farms had some weeks of paid labour as against 38.1% in 1961; in 1971, Canada census-farms each had on average 10.4 weeks of paid labour as against 10.0 in 1961; in 1971, 35.2% of all census-farms reported off-farm work of operator as against 32.0% in 1961. These trends hold even when we disaggregate by economic class of farm (see Table 3.10).

3. Reduction in farm family operator control – Has land tenure shifted more to operation under paid management? In 1961, 72.9% of total farms were owned and 20.8% were operated as part-owner/part-tenant (a total of 93.7%) as against 68.6% and 26.2%, respectively, in 1971 (a total of 94.8%).

In combination with previous findings, the facts above indicate that, while there have been significant structural changes in the nature of farming and reliance on family farms, basic management functions of farm operators have not been diminished. Even if we can argue with certainty that the farm operator performs less in marketing his final products and earns a larger share of his income from off-farm work, the same applies to both the small- and the large-scale farm operator.

Concluding then, if organization of farm production were destroying the family pattern of farm production as it has in many other commodity-producing industries, we would be witnessing a concentration of farm production, land and other productive resources into an increasingly small number of large farm organizations under the direction of salaried managers. While production and land are clearly concentrating, the fact is that concentration is in a rapidly expanding number of adequately sized farms of medium and large size.

3.6. Conclusions

This chapter has evaluated sources of and influences in total farm family income. Our analysis has revealed the following:

1. Over the last few decades, off-farm sources of income have played an increasingly important role in total farm family income. By 1971, approximately 73% of all reported farm cash income was attributable to off-farm sources.

2. In general, farm families in British Columbia, the Maritimes and Ontario are least dependent on farming.

3. At the provincial level, the off-farm contribution to total farm family income always exceeds the farm contribution. It is usually two to three times more important than farm self-employment income.

4. Only 43.9% of Canada's census-farm persons aged 15 and over earning income report farm self-employment as their major source of income.

5. On average, farm families with farm operator members who report self-employment farming as their major source of income have lower total income than those with farm operator members reporting non-farm income as their major source. In 95% of the cases, the farm operator family member is the family head and major income earner.

6. In general, the farm operator's percentage contribution to total farm family income represents a large majority and remains consistently the same regardless of province of residence or socio-economic characteristics used to disaggregate families; that is, contributions by other family members are small and represent a relatively constant fraction of total farm family income.

7. In general, farm operator family member income co-varies extremely closely with the level of farm family total income across provinces, regardless of the socio-economic characteristics used to disaggregate families. Peaks are always observed for British Columbia and Ontario, troughs for the Maritimes. This signifies that location or the prosperity of a regional economy operates as an important conditioner of farm family income.

8. On the basis of evaluation of influences in farm family income levels at the national and provincial level, we conclude that higher total family income is associated with location in some provinces over others, off-farm residence, economic class of farm, capital value of farm, family size, and farms that emphasize dairy, meat, or fruit and vegetable products.

9. Comparison of characteristics of farm families in low and high income census divisions adds additional support to the findings in 8 above. Analysis at the census division level further indicates that the major difference between the high versus the low income family groups lay in their opportunities and endowments to earn off-farm income.

10. Interaction of possible determinants of total farm family income levels was evaluated by using log-multiple stepwise regression techniques. For Canada and three derived regions, capital value and days of off-farm work accounted for most of the variation in farm family income levels. Variables to do with magnitude of farm operations slightly outperform variables to do with the role of non-farm income in the farm family income equation.

11. Although findings of this chapter indicate that a large share of Canadian census-farms are small, marginal farms with operators primarily involved in off-farm work, this does not imply that the farm family is on its way out. Although important structural changes have occurred in the reliance of families on their farms as a means of livelihood, both small- and large-family farms demonstrate essentially the same extent of economic self-sufficiency in operations, rely somewhat more on family than hired labour, and retain managerial prerogative.

FOOTNOTES

¹ This information can be found in Statistics Canada's *1958 Farm Survey Report, No. 2*, Catalogue 21-509. Figures in this report are likely to understate off-farm employment as the survey uses the 1951 census-farm definition which excludes small marginal farm holdings to a greater extent than does the 1971 definition.

² See United States 1969 Census of Agriculture.

³ The wage and salary figures in Column 1, Part A for farm family heads are slightly higher than for farm operators reporting wages and salaries (i.e., 41.2% in Table 3.2, Part A, Column 1, versus 37.8% in Table 2.14, Column 3), because not all farm operators are farm family heads.

⁴ The operator's share of net self-employment farm income does not actually represent all of the farm family's income from this source, but it comes very close to it, i.e., 95%.

⁵ For our purposes, the term "influence" is used to describe the general bearing of some variable x on income. That is, it is expected that movement of x somehow shapes the behaviour of income one way or the other (i.e., up or down).

CHAPTER 4

TYPOLOGIZING LOW VERSUS HIGH INCOME FARM OPERATORS

4.1. Introduction

A good deal of information has now been imparted about incomes of census-farm families. This chapter focuses specifically on census-farm operators and seeks to typologize characteristics which distinguish low from high income farm operators.¹ The aim of our typology is to reduce the numerous complexities and interactions among factors determining income by arranging such factors into broad categories which can be easily borne in mind. It should also facilitate generalizations about certain characteristics of persons if they are classified in specific cells of the typology. Of course, typologies should be open to empirical evaluation; to this end, we will employ a least squares technique called discriminant analysis, which is particularly well suited for evaluating the power of classificatory systems.

Though the "population" for our low/high income typology (hereafter L/H typology) is relatively homogeneous with respect to occupation (i.e., mostly male census-farm operators), previous analysis indicates that total income levels cannot be adequately understood merely in terms of farm performance. That is, there are subgroups within this "population" that are dissimilar with respect to their sources of income and their economic activity. Previous to presenting elements to our L/H typology then, it may be useful to summarize the major dissimilarities in the sources of income and economic activity of census-farm operators (residents and non-residents combined).² Sections 4.2 - 4.5 serve this task. They also identify "problem" subgroups and consider whether they should be excluded from our L/H typology.

4.2. Farm and Off-farm Employment Income

Off-farm income has an impressive role in shaping the "farm income distribution". Previous analysis of resident farm population indicates that high income operators are more likely to have off-farm employment income than low income operators. One reason is that alternate sources of income reduce the impact of farm losses or wide profit fluctuations. Another reason is that for some types, scales and organization of farming, it may be possible for operators to earn additional income from off-farm sources without hampering returns to the farm operation. Also, off-farm employment income represents an additional source of revenue for expansion of farm operations, which in turn may result in higher profits in any given year (e.g., purchase of fertilizer, new machinery). Further, we observe that, on average, those with the opportunity to earn non-farm income,

See footnotes on page 164.

earn a higher rate of return than those relying solely on net farm self-employment. Whereas the first consideration above relates to the higher risk involved in farm versus non-farm employment (i.e., differentials in stability and continuity of the flow of earned income), the last consideration above relates to non-parity of agricultural to non-agricultural incomes.

Even when operators are disaggregated by economic class of farm (Table 4.1), we find that operators in the higher sales categories (i.e., exceeding \$5,000) benefit considerably by off-farm employment income. The same applies to disaggregations of all operators with sales exceeding \$2,500 by type of farm (Table 4.1).

In addition, operators of dairy, poultry and fruit and vegetable farms not only have more equal "farm income distribution" than operators of other types of farms, but benefit more from off-farm employment income. That is, the proportion of dairy, poultry and fruit and vegetable farm operators with less than \$3,000 income from farming only (Column 4) declines by about 35% - 40% (Column 7) after earnings from off-farm employment are added. In contrast, the decline for other kinds of farms is only about 25% - 30%. Thus, type of farm may have a double effect on raising operator incomes: one associated with returns to particular types of farming and one associated with opportunities available to the operator to pursue off-farm employment.

The importance of off-farm employment income for an L/H typology is clear. It serves to separate those with low farm incomes and no alternative sources of income from those with low farm incomes and alternate sources of income. It also serves to elevate those with relatively high farm income to even higher total income strata.

Urban-rural income differentials within a province are also relevant to the L/H typology. On the basis of data, not shown here, on the numbers of low income farmers, it seems safe to propose that the largest provincial shares of operators in the low income categories are found in the Maritime provinces of Newfoundland and Prince Edward Island and the Prairie provinces of Manitoba and Saskatchewan. As for Canada's most well-to-do farm operators, the highest average incomes for farm operators are found in Ontario and British Columbia. As has been observed many times previously, differentials in a province's economic prosperity (as gauged by differential levels of rural, urban incomes, etc.) appear to be an important conditioner of incomes and, as such, are relevant to an L/H typology.

TABLE 4.1. Distribution of Census-farm Operators by Total Income, Farm Income and Total Employment Income, by Economic Class and Type of Farm, Canada, 1971

Item	Total income		
	Less than \$3,000 1	\$3,000-9,999 2	\$10,000 and over 3
Part A	per cent		
Gross sales category:			
Less than \$2,500	43.8	47.5	8.7
\$ 2,500 - \$ 4,999	48.1	45.6	6.3
5,000 - 9,999	46.1	45.9	8.0
10,000 and over	32.4	49.3	18.3
Part B	per cent		
Type of farm:			
Dairy	32.7	54.5	12.8
Cattle, hogs and sheep	44.3	43.9	11.8
Poultry	29.9	54.7	15.6
Wheat	49.0	42.7	8.3
Other field crops	42.1	44.3	13.5
Fruit and vegetable	24.8	54.8	20.3
Other	44.7	44.1	11.3
	Income from farming		
	Less than \$3,000 4	\$3,000-9,999 5	\$10,000 and over 6
Part A	per cent		
Gross sales category:			
Less than \$2,500	95.1	4.5	0.4
\$ 2,500 - \$ 4,999	83.5	15.8	0.6
5,000 - 9,999	74.5	24.3	1.2
10,000 and over	55.3	36.2	8.5
Part B	per cent		
Type of farm:			
Dairy	58.6	36.3	5.2
Cattle, hogs and sheep	71.0	24.8	4.2
Poultry	69.8	25.3	5.0
Wheat	73.8	23.9	2.3
Other field crops	68.9	26.2	4.9
Fruit and vegetable	64.3	30.2	5.4
Other	72.4	24.5	3.4
	Employment income from all sources		
	Less than \$3,000 7	\$3,000-9,999 8	\$10,000 and over 9
Part A	per cent		
Gross sales category:			
Less than \$2,500	48.0	44.9	7.1
\$ 2,500 - \$ 4,999	53.8	41.1	5.1
5,000 - 9,999	53.0	40.4	6.6
10,000 and over	37.9	52.8	9.3
Part B	per cent		
Type of farm:			
Dairy	39.5	49.1	11.4
Cattle, hogs and sheep	50.8	39.0	10.3
Poultry	35.7	50.2	13.8
Wheat	57.1	36.1	6.7
Other field crops	48.5	39.8	11.7
Fruit and vegetable	33.6	49.5	16.9
Other	51.0	39.1	9.9

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

4.3. Major Source of Income

Another important consideration in the design of an L/H typology is whether the farm operator is (i) predominantly an income earner, (ii) predominantly retired and relies on pension payments as a major income source, or (iii) experienced a heavy loss and is thus forced to rely on transfer payments as a major income source. While some operators rely much more on off-farm employment as a major source of income than others, some rely neither on off-farm nor farm employment income as a major source.³ Only 51% of Canada's census-farm operators report farming as a major source of income in comparison of 37% reporting wages and salaries, 7% reporting government transfers, 4% reporting investment income and 1% reporting pensions. At the same time, average incomes of "wage and salary" operators in each province are 1.5-2 times the income earned by "farming" operators; there is also a notable share relying largely on government transfers who have average incomes of less than \$2,000 (i.e., approximately 26,000 operators).⁴

See footnotes on page 164.

TABLE 4.2. Distribution of Census-farm Operators by Major Source of Income, Economic Class of Farm and Age of Farm Operator, Canada, 1971

Major source of income and age of farm operator	Total	Economic class of farm			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
	1	2	3	4	5
Farming					
Total	100.0	13.1	16.3	27.8	42.9
15-24 years	1.9	0.4	0.4	0.5	0.6
25-44 "	34.6	2.9	4.1	9.0	18.6
45-64 "	55.0	7.6	9.8	16.0	21.6
65 years and over	8.4	2.2	1.9	2.2	2.1
Off-farm employment					
Total	100.0	45.7	17.9	17.2	19.2
15-24 years	3.4	1.5	0.6	0.6	0.7
25-44 "	44.2	19.0	7.8	7.9	9.5
45-64 "	47.2	22.5	8.6	7.9	8.2
65 years and over	5.2	2.7	0.9	0.8	0.8
Government transfers					
Total	100.0	57.8	17.1	13.9	11.1
15-24 years	0.7	0.3	0.2	0.1	0.1
25-44 "	13.1	5.0	1.9	2.6	3.6
45-64 "	23.4	13.0	3.8	3.6	3.0
65 years and over	62.8	39.6	11.3	7.6	4.3

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Table 4.2 reveals that approximately 72.9% of those relying on government transfers are likely to be small or marginal farm operators (i.e., sales less than \$2,500), and that approximately 50% are over the age of 65 (i.e., 12,000). While there are obvious expected differentials in major source of income by economic class of farm, age does not appear to bear on the "farming" and "wage and salary" categories. In contrast, as higher ages characterize operators with government transfers as their major source of income, it is clear that our typology must make allowances for low levels of income associated with operators in the "government transfer or retirement category" (about 10,000).

4.4. Farm and Non-farm Occupations

As with operators reporting "wages and salaries" as major source, we expect that operators reporting non-farm occupations will have the highest total incomes. We would also expect that incomes of farm managers would be close to those of non-farm occupations, as managers usually operate large-scale, highly productive farms, draw wages or salaries, and are likely to be endowed with managerial skills for which a more highly competitive wage and salary market exists. We would expect incomes of "farmers" to rank third, followed by those stating "no occupation". The latter category consists largely of persons in the "retirement" category, with low incomes fed largely by government transfers and pensions.

The data (not shown here) bear out our relatively straightforward income hypothesis. In general, income levels of those with "non-farm occupations" rank first, followed by "farm managers", followed by those with "farm occupations". Those "not stating occupations" are not included here as our data do not enable us to exclude persons who refused answers to the occupation question. However, as members of this subgroup are, on average, considerably older and less educated than those of other categories, it seems reasonable to assume that they are heavily weighted in the direction of "retirement ages"

On the basis of our analysis thus far, there can be little doubt that the spread between low and high income operators is heavily conditioned by non-farm occupations and non-farm employment income. Among operators in the lowest income group (about 36.4% of all operators with average employment income of \$1,004), a large proportion report farm occupations during census week and have very little off-farm employment income. A notable share also have little employment income from off-farm sources as they are in the "retirement" category (age 65 and over) and rely heavily on government transfer payments as a major source of income.

These observations suggest that we are dealing with four major operator subgroups:

- (a) a low income subgroup consisting of those with little off-farm employment income;

- (b) low income "retired operators" relying largely on government transfers and pensions;
- (c) a medium income subgroup, about half of which would fall into the low income group without off-farm employment income; and
- (d) a high income subgroup, about half of which derives most of its income from off-farm employment.

With respect to self-employment farming, income characteristics of groups (a) and (c) give the impression that poor farm performance is at the root of the income problem for most of group (a) and that off-farm employment income has "come to the rescue" of about half the operators in group (c). While this interpretation is important in terms of representing influences in our typology, it may also be that too much emphasis is being placed on (i) inadequate farm performance/magnitude as a negative influence on total operator incomes and (ii) off-farm employment income as a "saving grace". That is, data to do with operators reporting "zero or loss" returns to self-employment farming lead us to question whether some farms are doing as poorly as they seem to be. This issue is important to our L/H typology as it raises the question as to whether off-farm employment income is as much a "saving grace" as it seems to be. If farm self-employment income were being underreported, then off-farm employment income would automatically assume a greater percentage share of the operator's total reported income. Of course, the possibility also exists that some members of group (c) are in a transitory stage of either entry to or exit from farming.

4.5. A Problem with Zero or Loss Net Farm Income

Census data (not shown here) indicate that very low provincial farm incomes for operators reporting non-farm occupations (ranging from \$100 - \$250, on average) are related to moderate agricultural sales of between \$2,500 - \$5,000 (on average) and relatively large farm sizes (250 - 500 acres - Newfoundland being an exception). One possibility is that these census-farm operators plough profits back into their farms towards building up their capital stock (particularly their real estate). This would explain the low self-employment farm income. This possibility is plausible, given that the capital stock of these operators is, on average, lower than their "farming" counterparts. Yet, given the younger age, higher education and higher income profile of this operator subgroup, it seems more likely that the opportunity would be available to this subgroup to build up farm assets relatively quickly through use of credit. Ploughing back meagre profits towards building up a small capital stock would obviously take a great deal of time before scale economies would be affected. It would seem that a more plausible explanation for this behaviour is that these operators benefit from maintaining an operation of small to medium magnitude because it provides them with (i) a good rate of return for minimum effort and investment, (ii) a solid tax loophole, and (iii) time to work at higher paying off-farm jobs.

As partial support for the argument that average earnings are probably underreported somewhat, we first consider the propensity to report loss or zero farm income by select farm characteristics, and then relate farm income to total income, occupation and education. Table 4.3 disaggregates census-farm operators who report zero or loss farm income by economic class of farm and type of farm. Line b of Part A reveals that 36.6% of all census-farm operators in Canada report zero or loss farm income, and line b of Part B reveals that 29.8% of all Canada census-farm operators with sales in excess of \$2,500 report zero or loss farm income. The interesting feature of this distribution is that a substantial proportion of census-farm operators reporting sales in excess of \$10,000 report zero or loss farm income as well (line c, Table 4.3, Part A). Also, in the most well-to-do provinces of Ontario and British Columbia, larger proportions of operators with sales of less than \$2,500, \$2,500 - \$4,999 and \$5,000 - \$9,999 report zero or loss than in almost every other province (line c, Table 4.3, Part A). We also observe, in Table 4.3, Part B, that operators of farms known to have the highest average total incomes (namely, poultry, dairy, fruit and vegetable) record the highest number of zero or loss farm incomes.

Of course, some farm operators are bound to experience severe losses due to weather variations, pestilence, diseased crops, over-production at a time of downward-shifting prices, mismanagement, etc. In such instances, farming may not represent a money-making proposition. Tables 4.4 A and B give a crude indication of the prevalence of these unfortunates. For example, Table 4.4 A indicates that of the 36.6% of Canada's census-farm operators who report zero or loss farm income, about 50% had total incomes of less than \$3,000 (meaning off-farm employment income was probably low), and about one third of these had farms with sales in excess of \$10,000. Given that operators with sales exceeding \$10,000 are generally more dependent on farming than operators in the lower sales categories, it may be that the 4.1% or 15,000 operators with sales greater than \$10,000, total incomes of less than \$3,000, and zero or loss farm income (as in Table 4.4 A), represents our best estimate yet of those really suffering from poor farm performance. At the same time, however, the fact that 1.3% of census-farm operators with sales greater than \$10,000 plus total incomes greater than \$10,000 report zero or loss farm incomes (Table 4.4 A suggests that some larger scale farms are being used for investment write-offs and possibly some tax loopholes.

To explore this possibility further, income from farming and other farm characteristics have been cross-classified with two factors associated with higher total incomes: namely, non-farm occupation during census week and education of the operator. Results presented in Table 4.5 are instructive. Part A compares attributes of two-farm operator subgroups, those reporting farming occupations and those reporting non-farm occupations during census week. Note that for operators in both groups an increase in level of education is associated with lower farm income (Column 2) and increasing off-farm income (Column 3) (much more so, of course, for the former group). The telling feature of this trend is that net farm self-employment income declines while (i) farm size remains relatively

constant in the former group but increases in the latter group, (ii) agricultural sales increase in both groups, and (iii) capital value of farms increases in both groups.

Behaviour of the latter subgroup is particularly interesting. On average, these operators report farming as their occupation during census week, have

TABLE 4.3. Percentage of Census-farm Operators Reporting Zero or Loss Net Self-employment Farm Income by Economic Class and Type of Farm, Canada and Provinces, 1971

No.		Part A - Economic class				
		Total	Less than \$2,500	\$2,500 - 4,999	\$5,000 - 9,999	\$10,000 and over
1	Canada a ¹	100.0	29.1	17.3	22.6	31.0
2	..... b ²	36.6	15.9	6.2	6.4	8.0
3	..... c ³	36.6	54.6	35.8	28.3	25.8
4	Newfoundland a	100.0	72.1	7.8	5.9	14.2
5	..... b	51.1	39.2	2.5	2.5	6.4
6	..... c	51.1	54.4	32.1	42.4	45.1
7	Prince Edward Island a	100.0	38.7	19.1	20.0	22.1
8	..... b	33.4	17.6	5.4	5.0	5.3
9	..... c	33.4	45.5	28.3	25.0	24.0
10	Nova Scotia a	100.0	57.1	12.4	10.4	20.0
11	..... b	45.3	30.8	5.0	3.3	6.1
12	..... c	45.3	53.9	40.3	31.7	30.5
13	New Brunswick a	100.0	52.4	14.4	12.0	21.2
14	..... b	48.4	30.7	5.7	3.9	8.1
15	..... c	48.4	58.6	39.6	32.5	38.2
16	Quebec a	100.0	33.1	18.5	23.3	25.1
17	..... b	31.1	15.3	4.9	5.2	5.6
18	..... c	31.1	46.2	26.5	22.3	22.3
19	Ontario a	100.0	30.6	14.1	17.5	37.9
20	..... b	41.8	19.0	6.2	5.9	10.7
21	..... c	41.8	62.1	44.0	33.7	28.2
22	Manitoba a	100.0	27.5	19.7	25.7	27.1
23	..... b	34.4	13.7	7.0	7.1	6.6
24	..... c	34.4	49.8	35.5	27.6	24.4
25	Saskatchewan a	100.0	18.0	21.5	31.1	29.5
26	..... b	30.0	8.0	7.0	8.2	6.5
27	..... c	30.0	44.4	32.6	26.4	22.0
28	Alberta a	100.0	25.6	16.5	22.8	35.1
29	..... b	37.0	14.3	6.4	7.0	9.4
30	..... c	37.0	55.9	38.8	30.7	26.8
31	British Columbia a	100.0	53.0	11.8	11.0	24.2
32	..... b	53.5	34.8	5.6	4.4	8.7
33	..... c	53.5	65.7	47.5	40.0	36.0

¹ a = percentage of census-farm operators.

² b = percentage of census-farm operators reporting zero or loss net self-employment income.

³ c = percentage ratio b/a.

Source: Statistics Canada, 1971 Census, unpublished tabulations drawn from the Agriculture-Population Linkage.

relatively large farms, agricultural sales and capital value. Yet, with higher education levels and higher off-farm income, they report smaller farm incomes. Although our use of highly aggregative averages obscures the exact nature of the relationships we wish to evaluate, it seems reasonable to propose:

- (a) that those with higher education and predominantly non-farm jobs are not particularly good farm managers (implying low net returns), and those with

TABLE 4.3. Percentage of Census-farm Operators Reporting Zero or Loss Net Self-employment Farm Income by Economic Class and Type of Farm, Canada and Provinces, 1971

Part B - Type of farm								No.
Total	Dairy	Cattle, hogs and sheep	Poultry	Wheat	Other field crops	Fruit and vegetable	Other	
100.0	21.4	34.7	2.2	13.0	17.3	3.0	8.3	1
29.8	4.7	10.9	1.0	4.1	5.5	1.1	2.5	2
29.8	22.0	31.4	45.5	31.5	31.8	36.7	30.1	3
100.0	26.3	10.5	17.5	-	14.0	17.5	10.5	4
40.4	12.2	5.3	12.2	-	5.3	5.3	3.5	5
40.4	46.4	50.5	69.7	-	37.9	30.3	33.3	6
100.0	22.6	33.6	1.1	-	23.0	0.9	18.6	7
26.5	4.2	9.9	0.2	-	7.7	0.7	3.6	8
26.5	18.6	29.5	18.2	-	33.5	77.8	19.4	9
100.0	40.4	25.0	6.8	-	3.0	9.3	15.1	10
34.8	11.3	10.3	3.0	-	1.0	3.4	6.0	11
34.8	28.0	41.2	44.1	-	33.3	36.6	39.7	12
100.0	30.4	18.8	4.2	-	27.2	4.0	15.5	13
38.7	9.5	7.1	1.6	-	13.1	1.4	6.0	14
38.7	31.3	37.8	38.1	-	48.2	35.0	38.7	15
100.0	69.5	12.7	3.8	-	3.8	3.8	6.4	16
24.0	14.9	3.7	1.5	-	1.1	1.2	1.7	17
24.0	21.4	29.1	39.5	-	28.9	31.6	26.6	18
100.0	27.2	42.5	3.0	0.5	12.1	5.8	6.0	19
33.3	5.9	16.2	1.4	0.3	5.0	2.0	2.6	20
33.3	21.7	38.1	46.7	60.0	41.3	34.5	43.3	21
100.0	6.2	38.9	2.2	10.7	30.0	0.3	11.7	22
29.2	1.4	10.2	0.7	4.0	9.4	0.1	3.3	23
29.2	22.6	26.2	31.8	37.4	31.3	33.3	28.2	24
100.0	1.1	25.1	0.3	42.0	22.6	-	8.9	25
27.0	0.2	6.1	0.1	12.7	6.0	-	2.0	26
27.0	18.2	24.3	33.3	30.2	26.5	-	22.5	27
100.0	5.3	56.3	1.0	8.2	20.5	-	8.5	28
31.1	1.2	16.6	0.3	3.0	7.3	-	2.7	29
31.1	22.6	29.5	30.0	36.6	35.6	-	31.8	30
100.0	18.3	30.2	6.9	2.2	8.5	22.6	11.6	31
41.3	4.9	13.9	2.8	1.1	4.3	8.6	5.7	32
41.3	26.8	46.0	40.6	50.0	50.6	38.1	49.1	33

¹ a = percentage of census-farm operators.

² b = percentage of census-farm operators reporting zero or loss net self-employment income.

³ c = percentage ratio b/a.

Source: Statistics Canada, 1971 Census, unpublished tabulations drawn from the Agriculture-Population Linkage.

higher education and predominantly farm jobs tend to experiment with expensive breeds may invest in far too much machinery and other gadgets which may depress the net figure, and/or

- (b) that higher education is associated with use of farms as an investment write-off because it is conducive to increased knowledge about ways and means of doing so, and/or
- (c) higher education is associated with use of farms as a tax write-off because it contributes to off-farm earning opportunities and therefore off-farm income which (i) would be taxed less heavily if a farm loss were reported or, (ii) would, at least, not be taxed more if positive farm income were ploughed back into the farm operation (i.e., meaning zero farm income).

TABLE 4.4 A. Percentage Distribution of Census-farm Operators with Zero or Loss Net Farm Income by Economic Class of Farm and Total Income, Canada, 1971

Income group	Total	Economic class of farm			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
		per cent			
Total	36.6	15.9	6.2	6.4	8.0
Less than \$3,000	16.8	6.0	3.1	3.5	4.1
\$ 3,000- \$5,999	9.0	4.5	1.7	1.3	1.5
6,000- 9,999	7.0	3.8	1.0	1.1	1.1
10,000 and over	3.8	1.6	0.4	0.5	1.3

Admittedly, none of these propositions above are well-founded. Indeed, all three are impossible to test, given the nature of the data we are working with. Yet, it is inconceivable, at least to this writer, that losses could have been consistently experienced across Canada and the provinces (as indicated in Table 4.5, Part B) by farm operators who (i) have university degrees, (ii) are generally younger, (iii) have, in most cases, relatively large farms, (iv) have sales ranging from \$4,000 - \$36,000, and (v) have farm capital value ranging from \$32,000 - \$102,000.

All this is to say that evaluation of the who's and why's of zero or loss farm income, and the seriousness of such reported losses for the well-being of Canada's farm population is an extremely difficult task. Possibly the best approach to the problem would be to examine the characteristics of those with zero or negative total income from all sources and those with positive total incomes to see which

suffer more from farm losses. At the very least, this approach would effectively isolate those who were not able to rely on off-farm employment income as a cushion against true farm losses. To this end, consider the characteristics of operators and their farms for the four income categories in Table 4.6 for Canada and a representative province of each region.

TABLE 4.4 B. Ratio of Proportion of Census-farm Operators Represented in Table 4.4 A (i.e., Those with Zero or Loss Farm Income) to Proportion of All Census-farm Operators in Each Economic Class by Total Income Cell (i.e., Operators with Both Positive or Zero/Loss Net Farm Income)

Income group	Total	Economic class of farm			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
		per cent			
Total	36.6	54.6	35.8	28.3	25.8
Less than \$3,000	40.5	47.2	37.8	33.3	40.6
\$ 3,000- \$5,999	30.4	56.3	32.0	20.3	15.2
6,000- 9,999	40.0	65.5	41.7	28.2	20.8
10,000 and over	33.0	61.6	28.6	27.8	22.8

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

According to Column 1, Table 4.6, 27,000 census-farm operators experience zero or negative total income, incur an average farm loss of -\$2,685, an average off-farm employment loss of -\$72 (which would include off-farm self-employment losses), and rely heavily on government transfers as a source of income. Differences among the four-income categories are quite revealing in that they indicate that those reporting zero or negative total incomes (i) operate relatively large-scale farms, (ii) are generally more reliant on farming as a means of generating income (as reflected by their fewer days at off-farm work), and (iii) are of medium age. Indeed, with respect to their over-all personal and farm factor endowments (e.g., age, education, farm capital value), they are second only to operators in \$10,000 or more category. This generalization applies to each of the three provinces as well.

TABLE 4.5. Select Census-farm Operator and Farm Characteristics by Operator's Level of Education, Canada and Provinces, 1971

Item	Number	Farm operator characteristics			Farm characteristics		
		Average income from farming	Average off-farm income	Average total income	Average size of farm	Average agricultural sales	Average capital value
	1	2	3	4	5	6	7
Part A							
Operators with off-farm occupation							
		dollars			acres	dollars	
Education level:							
Grades 9-11	29,867	102	6,203	6,305	290	5,700	47,700
Grades 12 and 13	11,255	168	7,282	7,114	319	8,620	59,300
Some university	3,293	215	8,328	8,113	297	6,840	61,600
University degree	3,225	972	15,127	14,155	304	12,750	89,000
Operators with farming occupation							
		dollars			acres	dollars	
Education level:							
Grades 9-11	64,050	2,481	2,038	4,519	687	14,950	85,900
Grades 12 and 13	17,240	2,474	2,396	4,870	730	18,920	106,800
Some university	5,585	2,131	2,410	4,541	791	21,180	113,100
University degree	1,455	1,578	3,928	5,506	824	30,090	142,600
Operators with off-farm occupation with university degree							
Part B							
		dollars			acres	dollars	
Canada	3,225	- 972	15,127	14,155	304	12,750	89,000
Newfoundland	5	- 1,657	14,593	12,935	9	9,270	54,200
Prince Edward Island	35	- 780	10,709	9,930	107	4,330	37,100
Nova Scotia	60	- 70	16,859	16,928	298	4,070	87,500
New Brunswick	50	- 511	9,669	9,156	182	3,760	31,900
Quebec	285	- 565	13,753	13,187	259	36,410	91,000
Ontario	1,270	- 870	17,169	16,799	154	14,330	102,000
Manitoba	200	- 1,105	13,103	11,998	433	7,620	52,500
Saskatchewan	345	- 795	11,723	10,931	588	7,470	64,900
Alberta	520	- 1,557	13,115	13,558	572	9,980	89,400
British Columbia	455	- 1,110	14,444	13,334	211	5,410	95,600

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Now, had we presented data for all provinces, we would have observed that the majority of the 27,000 operators with zero or loss total employment income are located in the Prairie provinces where the 1970 wheat problem was the heart of lower than usual incomes. Thus, in this instance, low incomes are more likely to be associated with particular types of farms than with tax manipulations.

Summing up, of the 36.6% of Canada's census-farm operators that report zero or loss income from farming, five major groups can be identified as being relevant to an L/H typology. These are:

Group	Share	Characteristics
	%	
1	3.6	in "retirement" category (aged 65 and over), with total incomes less than \$2,000, operating small farms (sales less than \$5,000), and reporting government transfers as a major source of income,
2	3.7	largely operators of farms located in the Prairies that have little or no off-farm employment income, with less than \$2,000 total income, and who rely on government transfers as a major income source,
3	3.7	largely operators of farms located in the Prairies that have little off-farm income, total incomes less than \$2,000, and rely on wages and salaries or investment income as a major source,
4	5.4	other operators with less than \$2,000 from all sources who rely largely on their farms for economic livelihood,
5	20.0	operators with over \$3,000 total income; 10.6% with total income over \$6,000; 3.8% with total income over \$10,000, of which about half have off-farm occupations and some university education or more,
Total	36.6	operators reporting zero or loss income from farming.

If "zero or loss" income from farming has been experienced by anyone, it is likely to be among members of Groups 1, 2 and 3 (about one third of all operators reporting zero or loss). Possibly, some or all of Group 4 could be added to Groups 1 - 3. With respect to Group 5, however, certainty about the legitimacy of zero or loss farm income decreases. In sum, the question remains empirically "open" and certainly merits further research.

Clearly, little can be done about the "zero or loss" problem unless we attempt to exclude suspect operators from the design and subsequent evaluation of our L/H typology. To do so, however, would require much more detailed data than are available. About all we can do at present is to bear in mind that off-farm employment income will be somewhat over-represented in income statistics due to underreporting of income from farming and that this possibility will tend to undermine both the theoretical adequacy and empirical evaluation of an L/H typology.

**TABLE 4.6. Census-farm Operators by Total Income by Average Values
of Select Operator and Farm Characteristics, Canada,
Nova Scotia, Ontario and Saskatchewan, 1971**

Item	Total income			
	Zero or loss	\$1 - \$1,999	\$2,000 - 9,999	\$10,000 and over
	1	2	3	4
Canada				
Number 000's	26.5	78.4	221.3	40.9
Average farm income \$	- 2,685	401	1,889	5,850
Average off-farm employment income \$	- 72	308	2,288	9,789
Major source of income:				
Farming %	0.4	51.5	49.7	34.5
Wages and salaries %	29.3	19.6	43.0	60.9
Government transfers %	47.0	22.8	2.9	0.2
Other investment %	10.3	5.6	3.9	3.7
Average age in years	47	52	48	46
Average education in years . .	8.8	7.8	8.3	9.4
Average number of days off- farm work	23	24	64	76
Average sales \$	14,350	7,570	10,510	21,980
Average capital value \$	86,400	52,900	61,600	10,300
Average expenses \$	5,380	2,810	3,960	8,390
Average machinery value \$	14,800	8,800	10,000	15,100
Average farm area in acres . . .	662	433	428	594
Average improved land area in acres	456	282	272	347
Percentage owners %	58.4	70.0	69.9	65.6
Percentage non-resident %	11.3	10.8	19.6	13.8
Average number of cattle . . .	46	30	34	52
Type of farm:				
Dairy %	3.4	17.2	67.9	11.5
Cattle, hogs and sheep %	8.1	22.2	58.9	10.9
Poultry %	6.2	15.3	64.1	14.4
Wheat %	10.9	26.8	54.9	7.4
Other field crops %	8.3	21.8	57.7	12.3
Fruit and vegetable %	4.0	15.0	64.4	16.6

TABLE 4.6. Census-farm Operators by Total Income by Average Values
of Select Operator and Farm Characteristics, Canada,
Nova Scotia, Ontario and Saskatchewan, 1971 - Continued

Item	Total income			
	Zero or loss	\$1 - \$1,999	\$2,000 - 9,999	\$10,000 and over
	5	6	7	8
Nova Scotia				
Number 000's	0.2	1.4	4.0	0.4
Average farm income \$	- 3,191	299	1,021	3,897
Average off-farm employment income \$	- 139	412	2,754	11,340
Major source of income:				
Farming %	0.0	36.1	25.7	24.4
Wages and salaries %	28.6	31.8	64.9	70.9
Government transfers %	34.3	28.2	5.9	0.0
Other investment %	8.6	3.9	3.0	4.7
Average age in years	49	57	51	48
Average education in years	9.3	8.1	8.8	10.4
Average number of days off- farm work	14	31	91	80
Average sales \$	10,430	4,100	8,560	3,028
Average capital value \$	43,700	24,300	33,000	77,000
Average expenses \$	6,400	2,550	4,590	16,950
Average machinery value \$	7,400	4,200	6,400	13,500
Average farm area in acres	234	208	218	295
Average improved land area in acres	93	53	61	112
Percentage owners %	69.4	83.5	80.0	74.4
Percentage non-resident %	8.6	2.5	3.0	5.8
Average number of cattle	23	16	22	32
Type of farm:				
Dairy %	2.7	20.8	67.2	9.7
Cattle, hogs and sheep %	3.4	24.6	66.2	5.9
Poultry %	3.7	13.0	68.5	14.8
Wheat %	-	-	-	-
Other field crops %	2.6	26.3	65.8	6.6
Fruit and vegetable %	3.4	23.7	64.4	8.5

**TABLE 4.6. Census-farm Operators by Total Income by Average Values
of Select Operator and Farm Characteristics, Canada,
Nova Scotia, Ontario and Saskatchewan, 1971 - Continued**

Item	Total income			
	Zero or loss	\$1 - \$1,999	\$2,000 - 9,999	\$10,000 and over
	9	10	11	12
Ontario				
Number 000's	0.7	16.1	58.4	14.7
Average farm income \$	- 3,338	277	1,628	5,571
Average off-farm employment income \$	- 29	361	2,864	10,629
Major source of income:				
Farming %	0.4	44.5	42.5	31.7
Wages and salaries %	29.1	21.1	49.3	63.1
Government transfers %	45.3	26.2	2.3	0.1
Other investment %	12.8	7.7	5.4	4.5
Average age in years	47	54	49	47
Average education in years . . .	9.1	8.3	8.8	9.8
Average number of days off- farm work	30	31	84	92
Average sales \$	21,115	9,890	13,270	23,800
Average capital value \$	89,800	57,500	68,600	104,500
Average expenses \$	8,630	4,200	5,310	10,430
Average machinery value \$	12,100	7,400	8,700	12,600
Average farm area in acres . . .	204	171	164	175
Average improved land area in acres	149	109	109	129
Percentage owners %	67.0	77.1	74.3	71.7
Percentage non-resident %	5.2	4.6	5.8	9.1
Average number of cattle	45	32	31	32
Type of farm:				
Dairy %	4.2	17.0	63.6	15.1
Cattle, hogs and sheep %	7.4	20.0	61.0	11.6
Poultry %	8.5	13.1	60.9	17.7
Wheat %	5.8	11.7	60.8	21.7
Other field crops %	6.6	12.8	58.4	22.1
Fruit and vegetable %	3.2	13.6	64.1	19.2

TABLE 4.6. Census-farm Operators by Total Income by Average Values of Select Operator and Farm Characteristics, Canada, Nova Scotia, Ontario and Saskatchewan, 1971 - Concluded

Item	Total income			
	Zero or loss	\$1 - \$1,999	\$2,000 - 9,999	\$10,000 and over
	13	14	15	16
Saskatchewan				
Number 000's	8.0	20.0	43.0	6.3
Average farm income \$	- 2,154	521	2,422	7,038
Average off-farm employment income \$	- 77	220	1,553	7,570
Major source of income:				
Farming %	0.4	59.9	63.2	45.2
Wages and salaries %	28.5	15.0	30.0	50.7
Government transfers %	50.0	19.3	2.2	0.4
Other investment %	11.5	5.3	4.2	3.0
Average age in years	47	51	49	46
Average education in years	8.8	8.0	8.7	9.4
Average number of days off-farm work	16	18	41	46
Average sales \$	10,070	6,620	9,110	17,500
Average capital value \$	83,900	7,700	70,700	107,600
Average expenses \$	3,170	2,000	2,560	4,900
Average machinery value \$	16,500	10,800	13,100	20,100
Average farm area in acres	950	672	846	1,228
Average improved land area in acres	714	497	603	851
Percentage owners %	49.3	56.8	53.8	47.4
Percentage non-resident %	19.3	22.4	25.8	27.1
Average number of cattle	41	27	33	56
Type of farm:				
Dairy %	5.3	17.6	54.7	27.1
Cattle, hogs and sheep %	10.2	24.6	55.1	22.3
Poultry %	2.1	20.8	62.5	10.1
Wheat %	11.1	26.8	55.4	16.7
Other field crops %	9.8	24.6	56.6	6.6
Fruit and vegetable %	-	-	-	9.0

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

4.6. A Proposed Typology

Chapters 2 and 3, and Sections 4.1 through 4.4 provide many clues about individual factors which are associated with differential income levels. While most of these factors merit individual consideration, it is also apparent that most can be grouped into broad categories.

For purposes of developing an L/H income typology, five major influences or conditioners of total farm operator income are distinguished. These are (i) human factor **endowments** conducive to higher productivity, regardless of whether the job is self-employment farming or off-farm work (e.g., level of education), (ii) **scale** of farm enterprise (e.g., farm capital value, size, value of machinery), (iii) **opportunities** for off-farm work (e.g., availability of off-farm jobs as a means of supplementing low farm incomes), (iv) **regional income returns** (e.g., over-all prosperity of the region, which would have an effect on price levels for farm produce, wage levels to non-farm work and local growth and development), (v) risk involved in self-employment activity (e.g., risk of epiphenomenal losses more likely to be experienced by some types of farms than others, due to weather variations, fluctuations in demand, etc.).

In one way or another, these influences are well-known to economic theory. Further, risk, production efficiency and scale have been analyzed previously at the farm level and on an aggregate basis with Census of Agriculture and annual series data (see *Canadian Journal of Agricultural Economics*); opportunities for off-farm work have been analyzed previously (see Bollman, 1973, MacMillan, *et al.*, 1974); agricultural economists have been arguing for years about the existence of scale economies and problems of defining and measuring risk and uncertainty. What is not known, however, is the empirical relationship between incomes and combinations of these influences (however crudely measured they might be) in the context of Canadian farming. With this in mind, we propose the typology in Table 4.7 as a means of (i) conceptualizing interactions of the five hypothesized influences, and (ii) describing "income levels" that are expected to be associated with various combinations of influences.

A previous analysis indicates that an appreciable share of Canada's farm operators can be classified as "retirement operators" (with major source of income being government transfers), this group is represented as a category largely outside the five aforementioned influences. Cells are labelled, or stratified, according to broad income types. Stratification is, of course, relative with no *a priori* reason for Types I or VII beginning or ending where they do.

Of course, the rationale for classifying operators as **Type I** (lowest income) versus **Type VII** (highest income) does not follow a clearly specified model of income determinants. Rather, we begin by describing a profile of farm and farm operator characteristics that are known to be associated with low incomes and progress to higher income types with "improvements" in the profile of characteristics. Improvements in the profile of characteristics expected to bear

Possibly, the best way of elaborating on the rationale for the discrepancies observed in Table 4.7 would be to discuss each type briefly:

1. Operators of small-scale farms (implying low net farm self-employment income) with low endowments for off-farm work (implying low wage rates to off-farm work), and low opportunities for off-farm work (implying limited availability of off-farm jobs), are classified as our lowest farm operator income group - Type I. Four cells have been labelled Type I because (i) with low endowments and opportunities for off-farm work, there is little reason to expect that differential regional income returns will have much effect on off-farm contributions to the operator's total income, (ii) where scale of farm is small, there is no reason to expect differential regional income returns to play much of a role in realized farm income, and (iii) there is no reason to expect that substantial risks will be taken in small-scale farming which might result in either substantial "windfall" profits or heavy losses.

2. In contrast to Type I, operators in the Type II category have the opportunity to offset the low returns to their small-scale farms with some off-farm employment income. However, returns to off-farm employment among members of this cell will be relatively low given their low endowments (implying low wage rates), and their residence in areas of low regional income returns (again, implying lower wage rates).

3. As with Type II operators, Type III operators have small-scale farms but their income will tend to be higher because their wage and salary income will be conditioned upwards by their location in areas of high regional income returns. Type III is also applied to operators of large-scale farms where the farmer has low endowments, few opportunities, and resides in a low regional-income-returns area, but operates a high risk farm. Membership in this cell is expected to be small and will likely include farms that are open to epiphenomenal losses (e.g., wheat farmers) whose operators have low endowments implying that managerial skills may also be lacking. The retirement category is also labelled Type III as previous analysis shows that incomes of these operators would lie in a range corresponding to total income of their Type III counterparts in the labour force. However, it is also true that the incomes of those in the retirement category would probably be much more adequate, given their much smaller dependency burden.

4. Type IV is applied to operators who have high endowments for off-farm work. Even though these operators are located in a low opportunity, low regional-income-returns area, we would expect them to seek out full-time wage or salary work, and with high endowments we would expect them to be successful in getting it. In this case, Type IV is applied to small-scale farms regardless of risk, as we expect the farm to play a very small role in the income equation of these operators. Type IV is also applied to operators of large-scale farms in (i) the low risk/low regional-income-returns category, (ii) the high risk/high regional-income-returns category, and (iii) the high risk/high opportunity and low regional-income-returns category. That is, operators in each of these categories have one more positive conditioner of income in their favour than operators classified as Type III.

5. Type V is applied to small-scale farms where operators have high endowments for off-farm work and high regional income returns. Again, we expect that those who secure jobs will earn somewhat more than their counterparts in low regional-income-returns areas, and that risk to be farming is not important here because non-farm income is likely to be the major source for members of this category. Type V is also applied to large-scale farms for operators with low endowments as returns to the large-scale farm are expected to be high and to be conditioned upwards by high regional income returns. Although Type V is assigned to three cells where characteristics vary, the similarity between cells is that, in contrast to Type IV, each has one small positive conditioner of income in its favour. With respect to highly endowed operators, however, our rationale for assigning Type V to both low and high risk farm operators (regardless of farm scale) is based on the assumption that the operators in question are more likely to succeed in their risk-taking ventures. That is, their higher endowments imply better management skills. Of course, some high risk operators will miscalculate, etc., and will experience set-backs; thus we assign Type V to both the low and high risk categories as against assigning a higher income type to operators in the high risk category.

6. The difference in degree between Types VI and VII for small-scale farms will be due to the bearing of residence in high/low regional-income-returns areas on the off-farm wage and salary income levels. Again, high or low risk is expected to play a very small role in total income of operators of small-scale farms. The difference between Types VI and VII for operators of large-scale farms is due, again, to differential regional income returns. Risk is expected to play a small role for the highly endowed operator for the same reasons discussed above.

Now, the rationale offered in defence of assigning a particular income type to particular cells in our typology may be open to some dispute. This is expected. However, the major orientation of the typology should be clear. Furthermore, the reader should observe the closing of the gap between income types as the typology moves from low to high endowments – the reason being that with the low endowments, scale of farm holding bears most on realized income. However, with higher endowments, the operator – be he an owner of a small- or large-scale farm – can turn more to off-farm work, where rates of return fluctuate less. Thus, if the operator's endowments are high, there is no reason why we would expect him to continue farming if he could earn more at wage and salary work. For those in the high endowment category, if a farm operator is to be found operating a farm full-time, we would expect to observe near parity between his rate of return and that of the operator employed largely as a wage or salary earner.

4.7. Classificatory Power of the Typology

One way of gauging the utility of a typology is to evaluate whether census-farm operators at various levels of income have socio-economic characteristics which comply with empirical measures of the five influences represented in

the typology. To some extent this has already been done through the use of two-way classifications of income distributions or average total incomes by select farm operator characteristics. However, we have as yet to evaluate which characteristics influence income levels more than others or whether and how these influences interact as suggested by our typology.

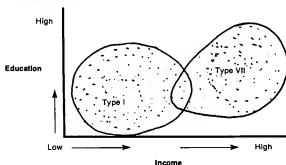
Towards evaluating the classificatory power of our typology we employ least squares discriminant analysis. Briefly, discriminant analysis can be used to answer the following:

- (a) is there a "significant" difference between groups;
- (b) if yes to (a) then what are the variables contributing to the difference and what is the degree of contribution; and
- (c) which entities have been misclassified by the researcher?

To illustrate, consider the scatter diagram of operators by education and total income in Chart 4.1. Types I and VII relate to our typology.

Chart 4.1

Schematized Discriminant Function



Discriminant analysis seeks to quantify, in terms of an index of distance, whether Type I operators are (i) homogeneous with respect to, say, level of education, and (ii) significantly different from Type VII operators with respect to level of education (i.e., in this case education would represent our surrogate of operator endowments). It is concerned with whether there is overlap between the two groups. If each group were identical with respect to education, both circles in Chart 4.1 would overlap entirely. As our example shows, there is some overlap but most operators are either in one group or another.

The utility of this technique is that it quantifies the degree of overlap (e.g., of average level of education of each group), and measures its statistical significance when a number of variables are being evaluated simultaneously (e.g.,

age, education, proximity to urban areas, etc.). Of course, for the discriminant function, we seek a conceptually meaningful set of indicators and understanding of how measures of these indicators work in conjunction with each other towards identifying the structure of which they are part. Unlike typical factor analysis, the surrogates of our five broad influences are clearly defined. Unlike uni-variate analysis, it takes into account the relationship among variables. In addition to testing the hypothesis that the socio-economic conditions between the various income types are different, it provides a ready means for identifying operators which are atypical of their income group.

An essential aspect of discriminant analysis is that it maximizes the mean difference between two sets of observations. The resulting function maximizes the difference between two or more groups in terms of the included indicators. No formal rules can be laid down for finding clusters because a cluster is not a well-defined group. The only criteria are to maximize distance between values of characteristics of each group (D^2 or Mahalanobis distance), while maintaining an adequate F ratio.⁵

In our application of discriminant analysis, we represent each of the five influences in our typology by select variables derived from 1971 Census data. For example, variables at our disposal which could be used to represent the five influences include:

Influence	Empirical measures
human factor endowments	age, ethnic origin, sex, education
scale of farm enterprise	sales, capital value, value of machinery, area, number of cattle, number of chickens, value of expenditures
opportunities for off-farm work	proximity to non-farm labour markets, days of off-farm work, off-farm employment income
regional income returns	regional differentials in family income levels, differentials in transfer payment levels
risk of farming	type of farm, use of fertilizer, rental of land.

In some cases, links between the empirical measures and the five influences are relatively straightforward. Level or cumulative years of education is a well-known indicator of an individual's human factor endowments. If there is

See footnotes on page 164.

debate over the use of this variable, it usually concerns measurement; does it take vocational training, quality of schooling or individual ability into consideration? In other cases, links between indices and influences are crude, if not somewhat vague. For example, risk is an extremely difficult influence to represent empirically, especially with the use of census data. Only in the most general way would we propose that wheat farming, for example, involves more risk than, say, dairy or poultry farming; the same applies to risk associated with outlays of money purchase of fertilizer, or rental of land as a means of raising productivity.

Does non-correspondence between empirical measures and conceptual influences negate the utility of a typology? Obviously, the answer to this question depends on the degree of non-correspondence over the range of influences being considered. By no means are answers to such questions obvious. Indeed, questions concerning adequacy of empirical measurement plague almost all ongoing social research. Accordingly, with respect to the empirical measures proposed above, it would be misleading to assume that results of the test to follow would produce an unequivocal evaluation of the utility of our typology. Such a feat would require access to a great deal more data than is available in the Ag-Pop data base.

Now, selection of variables for particular discriminant functions should also be guided by the following:

1. Variables should be related to the population subgroups under consideration. For example, if the subgroups consist largely of males, sex as a discriminator of income level will not be relevant.
2. Variables measuring the same or different influences should be relatively independent of each other. For example, age and level of education of operators would each represent a different element of human factor endowments, and statistically, should be independent of one another.
3. Every attempt should be made to minimize numbers of variables toward deriving as simple an empirical representation of influences in income as possible.

Our application of discriminant analysis is applied to subgroups of farm operators at the census division level. For the bulk of the analysis, three subgroups have been identified within each census division: (i) those with total incomes less than \$2,000 (the low income subgroup = a total of 105,000 operators in 252 census divisions), (ii) those with total income between \$2,000 - \$9,999 (the medium income subgroup = 221,000), and (iii) those with total incomes exceeding \$10,000 (the high income subgroup = 45,000). For each subgroup, average farm operator and farm characteristics have been tabulated for each of 252 census divisions. The discriminant analysis seeks to identify major differentials between the low versus high (hereafter L/H), the low versus medium (hereafter L/M) and the medium versus high (hereafter M/H) subgroup combinations. Thus, each discriminant function works with empirical measures on two-operator subgroups for 252 census divisions (i.e., $N = 252 \times 2 = 504$).

Two-group discriminant functions are preferred to one three-group function in the interests of checking on consistency of findings for the groups of predominant interest, namely: L/H. Over-all, then, our evaluation pertains to aggregate average characteristics of operator subgroups for areas.

We complement the above approach by grouping 252 census divisions into high and low income census divisions (per capita incomes less than \$2,000 and greater than \$2,000), and contrast the average characteristics of operators in each. Although this approach is less rigorous, it permits evaluation of a dimension of our typology which is not possible in the three-subgroup analysis, namely: a measure of opportunities for off-farm work and a measure of regional income returns. Neither measure could be represented in the three two-way subgroup discriminant analysis as each relates to a characteristic of the census division as a whole as against each subgroup within the census division (e.g., proximity of the census division to an "urban agglomeration"). We also summarize correlation results deriving from the regression analyses in Chapters 3 and 5 which also bear on the above.

4.8. Empirical Results

In view of the "variable selection criteria" and the exemplary "empirical measures" set out above, 22 variables were selected for our discriminant analysis (see Table 4.8). Choice of these variables was relatively arbitrary though previous correlation and regression analysis (see Tables 3.8 and 3.9) provided useful guidelines. Again, some of these variables obviously overlap but were included toward identifying those with the greatest discriminatory power. All data were log-transformed prior to analysis as there were indications of non-linearity for most variables.⁶

A number of discriminant equations were performed with three objectives in mind. First, we sought to evaluate which measures, or combinations of measures, of each of the five influences had greatest discriminatory power. Second, we sought to add the most powerful discriminators to one another, one at a time, toward identifying their relative discriminatory power. Third, we sought to arrive at one over-all equation with maximum discriminatory power. In effect, this is a building-block approach that strives to present results with maximum clarity.

Now, our first discriminant function included two variables thought to be most representative of an operator's human endowment profile, namely: age and education. The measure of education pertains to cumulative years of completed formal schooling. Limitations of the variable are that it does not include vocational training or adjustments for differentials in quality of education or individual ability. Age represents a number of effects; older age implies fewer dependents

See footnotes on page 164.

TABLE 4.8. Correlation Coefficient Matrix of Variables Used in the Discriminant Analysis¹

Variable		Variable								
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Age	1.00	- 0.47	- 0.51	- 0.24	- 0.08	- 0.06	- 0.08	- 0.32	- 0.13
(2)	Farm income		1.00	0.59	0.51	0.26	0.24	0.30	0.53	0.38
(3)	Off-farm employment income.			1.00	0.36	0.01	0.03	0.17	0.30	0.35
(4)	Farm sales				1.00	0.34	0.35	0.54	0.56	0.80
(5)	Improved land (acres)					1.00	0.95	0.89	0.53	0.29
(6)	Farm area						1.00	0.87	0.50	0.28
(7)	Farm capital value							1.00	0.52	0.51
(8)	Farm machinery value								1.00	0.45
(9)	Farm expenditures value . . .									1.00
(10)	Number cattle									
(11)	Off-farm work (days)									
(12)	Education (years)									
(13)	Percentage owners									
(14)	Percentage non-residents . . .									
(15)	Percentage dairy farms									
(16)	Percentage cattle, hog, sheep farms.									
(17)	Percentage poultry farms . . .									
(18)	Percentage wheat farms									
(19)	Percentage other field combination.									
(20)	Percentage fruit and vegetable farms.									
(21)	Total income									

¹ These correlations are derived from pooled observations for operators of the low, medium and high income subgroups, i.e., 3 x 252 census divisions = 756.

TABLE 4.8. Correlation Coefficient Matrix of Variables Used in the Discriminant Analysis¹

Variable												Variable
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
-0.05	-0.29	-0.17	0.17	-0.08	-0.11	0.12	-0.01	-0.08	-0.12	0.16	-0.55	(1)
0.24	0.12	0.21	-0.21	0.05	0.14	-0.14	0.01	0.06	0.19	-0.14	0.81	(2)
0.07	0.56	0.47	-0.08	0.01	0.03	-0.02	0.09	-0.10	-0.03	-0.05	0.95	(3)
0.38	-0.02	0.27	-0.24	0.03	-0.01	-0.02	-0.03	0.03	0.14	-0.00	0.46	(4)
0.93	-0.10	0.16	-0.32	0.13	-0.18	0.14	-0.09	0.32	0.09	-0.12	0.12	(5)
0.94	-0.07	0.17	-0.32	0.10	-0.20	0.22	-0.09	0.26	0.04	-0.12	0.12	(6)
0.91	0.02	0.32	-0.27	0.04	-0.19	0.18	-0.05	0.11	0.05	0.00	0.24	(7)
0.41	-0.06	0.34	-0.53	0.19	-0.20	0.02	-0.15	0.37	0.33	-0.14	0.43	(8)
0.33	0.04	0.21	-0.10	-0.05	0.05	-0.04	0.05	-0.09	0.06	0.03	0.39	(9)
1.00	-0.03	0.14	-0.19	0.02	-0.06	0.23	-0.07	0.05	-0.04	-0.10	0.15	(10)
	1.00	0.43	0.09	-0.12	-0.19	0.12	0.15	-0.21	-0.10	0.04	0.43	(11)
		1.00	-0.31	0.06	-0.45	0.23	0.12	0.14	0.00	0.03	0.42	(12)
			1.00	-0.25	0.35	-0.10	0.17	-0.48	-0.31	0.13	-0.15	(13)
				1.00	-0.17	-0.04	-0.09	0.35	0.13	-0.02	0.03	(14)
					1.00	-0.44	-0.08	-0.35	-0.35	-0.10	0.09	(15)
						1.00	-0.15	-0.08	-0.16	-0.26	-0.07	(16)
							1.00	-0.12	-0.13	0.04	0.07	(17)
								1.00	0.15	-0.15	-0.04	(18)
									1.00	-0.06	0.04	(19)
										1.00	-0.13	(20)
											1.00	(21)

¹ These correlations are derived from pooled observations for operators of the low, medium and high income subgroups, i.e., 3 x 252 census divisions = 756.

and therefore less motivation to sustain large incomes through additional off-farm employment, whereas younger age implies not only energy and dependent-related motivation to increase employment income but, possibly, greater reluctance to accept "traditionally" low farm incomes. Both variables exhibit the desirable property of being relatively independent of one another ($r = -0.17$, see Table 4.8).

Equation 1, below, serves to illustrate how statistics of discriminant analysis are to be interpreted:

Equation	Indices	Influence under consideration
1	$D^2 = + \log \text{Age} - \log \text{Education}$	human factor endowments

where; D^2 = a measure of statistical distance between two groups (e.g., L/H) based on their extent of difference in average operator age and education; $+ \log \text{Age}$ = an expectation (i.e., hypothesis) that the low income group will be of an older age (+) than the high income group; $- \log \text{Education}$ = an expectation (i.e., hypothesis) that the low income group will have a lower level of accumulated education (-) than the high income group.

Now, utility of D^2 is largely relative. If $D^2 = 2.5$ for Equation 1 above, and $D^2 = 5.0$ for Equation 1 with the addition of another variable (say, size of farm as a measure of scale), then we know that the addition of the third variable results in almost equal power for discriminating between the low and high income groups as do age and education combined. As a complement to the differences between equations (as indicated by different D^2 values), each equation will also tell us what proportion of the low versus high income units of observation would be classified as low income subgroups on the basis of the estimated discriminant function (i.e., the variables in the equation). That is, the equation will tell us how well the variables in the equation (such as age and education) "truly" identify low income operators as members of low income operator subgroups or whether little identification is possible because both low and high income operators share the same age and education characteristics.

As a final note on the expected and empirically estimated signs before the variables in the equations, the reader should keep in mind that: a **+ sign** always means that the low income group has a higher value for the index in question than does the high income group, whereas a **- sign** implies the converse.

Results for the three paired income subgroups are presented in Table 4.9. Each L/H, L/M, M/H pair covers 504 observations (i.e., 252 census divisions x 2). Results can be summarized as follows:

1. Both age and education take on the hypothesized sign. For each subgroup pair, low income operators are generally older and less educated than high income

operators.⁷ D² ranges from 1.3 - 3.9 for L/M and L/H, respectively (each being statistically significant: see Columns 6 and 7). But the power of this equation to differentiate between low and high income groups is relatively low. Only 32.1% of the low income operators of the L/H pair are correctly classified as low, and 43.7% of the high operators are correctly classified as high (Column 10). This

See footnotes on page 164.

TABLE 4.9. Results of Discriminant Analysis

Equation and group	Age	Education	Major source of income				
			Government transfers	Net farm income	Off-farm employment		
			1	2	3	4	5
Equation 1	L/H	0.108	- 0.029	1	1	1	
	L/M	0.081	- 0.009	1	1	1	
	M/H	0.088	- 0.031	1	1	1	
Equation 2	L/H	0.015	- 0.001	0.048	1	1	
	L/M	0.030	- 0.006	0.014	1	1	
	M/H	0.072	- 0.022	0.015	1	1	
Equation 3	L/H	0.014	- 0.022	0.048	- 0.009	1	
	L/M	0.041	- 0.009	0.013	- 0.005	1	
	M/H	0.069	- 0.033	0.013	- 0.016	1	
Equation 4	L/H	0.015	- 0.013	0.049	- 0.008	- 0.032	
	L/M	0.052	- 0.016	0.015	- 0.003	- 0.020	
	M/H	0.089	- 0.033	0.023	- 0.004	- 0.074	
	D ²	F ratio	Percentage accurately classified				
			Low as low	High as high	Total	All combined	
	6	7	8	9	10	11	
Equation 1	L/H	3.9	248.3	32.1	43.7	37.9	24.5
	L/M	1.3	82.2	11.1	6.0	8.6	
	M/H	1.8	115.5	14.3	39.7	27.0	
Equation 2	L/H	30.5	761.4	96.4	42.6	69.5	54.1
	L/M	6.1	152.2	46.4	47.6	47.0	
	M/H	5.0	124.9	55.2	36.5	45.9	
Equation 3	L/H	37.3	774.4	98.0	87.7	92.8	74.0
	L/M	8.0	166.5	71.4	49.2	60.3	
	M/H	7.3	151.9	64.5	72.0	68.8	
Equation 4	L/H	58.7	1,215.6	100.0	100.0	100.0	97.6
	L/M	18.0	374.8	98.0	90.5	94.3	
	M/H	27.4	570.3	98.0	99.2	98.6	

¹ Indicates that this variable was not included in the equation.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

means that age and education profiles are not highly dissimilar between any of the subgroup pairs. Averaging the total classificatory power of the L/H, L/M and M/H subgroups, as in Column 11, reveals that, on average, only 24.5% of all operators have been correctly classified in their true income category on the basis of age and education. As for the other indices of endowments such as sex, ethnic group, etc., these have been systematically ruled out as most operators are males; differentials in income by ethnic origin are attributable more to education of operator, etc.

2. Equation 2 builds directly onto Equation 1 by adding our only measure of "labour force versus retirement status", namely: "percentage of operators in each subgroup who rely on government transfers as their major source of income". According to previous analysis (Section 4.3), this variable seems to be a reasonably good indicator of those of retirement ages (65 and over).

As age and "government transfers as a major source of income" are related "correlation $r = 0.60$ " (see Table 4.8), the drop in value of the age coefficient in Equation 2 is understandable. Our interpretation is that the government transfer variable helps separate out the relevant influence previously "nested" in the age variable. The utility of the retirement dimension in our typology is evident in the light of: (i) the jump in D^2 for the L/H pair from 3.9 - 30.5, (ii) the improved over-all classificatory power of Equation 2 (54.1% versus 24.5% in Column 11, Table 4.9), and (iii) the high classificatory power of Equation 2 for the low income subgroup (i.e., 69.5%). However, it is also important to note that, while inclusion of this variable improves the classificatory power of the discriminant function for the low income group (see Column 9 versus 10), the same does not apply for the high income group. That is, we know that operators relying on government transfers, in the form of pensions, etc., are recipients of relatively small incomes.

3. Our next step was to add on our best measure of scale. A problem, however, is that our most direct measures of scale served as poor discriminators. The best among the lot (among capital value, farm expenditures, area, etc., as in Table 4.8) was "average farm sales" which had a very low $D^2 = 1.0$ and classificatory power of only 2.5% for the L/H pair. Accordingly, we chose "net farm income as a major source" as a next best measure of scale though it encompasses success at farming and dependency on farming as well as scale.

Effects of adding this variable are represented in Equation 3, Columns 6, 10 and 11. D^2 rises from 30.5 - 37.3 for the L/H pair, and over-all discriminatory power jumps from 54.1% - 74.0% (Column 11). Further, classificatory power of the discriminant function has increased almost evenly for the "low" and "high" categories of each pair. As for degree of independence between each of the four variables in Equation 3, a few intercorrelations in the order of 0.50 can be observed in Table 4.8. However, the F ratio for Equation 3 for each pair tested is significant at the 0.05 level. Furthermore, the reader should be well aware that

one can find few truly independent socio-economic measures in reality and that with most of the intercorrelation coefficients in the order of 0.5 or less, we are doing quite well.

4. Equation 4 adds on the measure of opportunities for off-farm work that exhibits greatest discriminatory power: namely "off-farm employment income as a major source" Of course, this measure is only a partial, after-the-fact reflection of opportunities, in that it represents employment income attained, not the ratio of employment income sought to that attained.

Unfortunately, it was not possible to represent "conditioners" of off-farm employment opportunities such as operator's proximity to non-farm labour markets as each low, medium and high income subgroup originates from the same census division, meaning each L, M, H group would receive the same value for an urban proximity dummy variable. In effect then, this consideration is controlled for.

Further, off-farm employment income (or days of off-farm work) is likely to be collinear with age and education of operator ($r = -0.51, 0.47$, respectively). This means that off-farm employment income as a major source does not independently reflect opportunities for off-farm work due to the possibility that the opportunities are likely to hinge on endowments conducive to the off-farm work (e.g., required educational level). On the other hand, luck, organizational ability, knowledge, contacts and information about opportunities, etc., may be more a derivative of attained income than endowments conducive to attaining higher income. That is, income and the consumption of information, travel, contacts, investment, etc., that it affords may be fundamental to generation and perpetuation of opportunities for off-farm work.

Equation 4 represents quite an improvement over 3 in that over-all classificatory power becomes near perfect (97.6%, Column 11), is considerably more even among pairs (particularly for the L/M pair), the D^2 value jumps from 37.3 - 58.7, and statistical significance is in the 0.01 range.

5. As for risk in farming, variables such as type of farm, amount of rented land, improved land, value of machinery, etc., were considered but with little success. While we did find that dairy and poultry farms were more associated with high than low income groups, and that rented land was associated with the high groups more than the low groups, these variables were not very useful for classifying operators according to income level.

6. On the basis of jumps in D^2 values (Column 6), consistency of classificatory power across each subgroup pair (Column 10), over-all classificatory power (Column 11) and jumps in the F ratio (Column 7), it appears that opportunities (measured by "off-farm income") ranks first in discriminatory power, labour force status (as measured by our surrogate of those in retirement ages) ranks second, scale of farming (measured indirectly by net farm income) ranks third, and endowments (measured by age and education) ranks fourth.

7. While the results summarized in 6 suggest that our typology and its empirical representation are useful as a tool for distinguishing characteristics of low versus high income farm operators, our evaluation is far from conclusive. Its major flaw is that it neither represents all of the influences in our typology nor represents influences with ideal conceptual clarity or empirical rigour. The most obvious example is the term risk which simply implies more theoretical and analytical rigour than is possible to evaluate with the Ag-Pop data set. This means that the empirical ranking of influences in 6 above represents, at best, a beginning.

As noted previously, it was also not possible to include "proximity to urban areas" as an index of opportunities for off-farm work, and "differentials in regional wage and salary levels" as an index of regional income returns. Thus, we turn briefly to an evaluation of the relevance of these variables in a slightly modified empirical evaluation of our typology.

Upon tabulating average operator characteristics for 252 census divisions, two operator groups were formed: a low income group (per capita of operator family members less than \$2,000, N = 161), and a high income group (greater than \$2,000, N = 91). Discriminant analysis and estimation of equations similar to those in Table 4.9 were performed to check for consistency of findings and evaluation of our urban proximity variable. Maps were used to ascertain "urban proximity". Each census division was assigned a value of 0 or 1 depending on (i) whether it had, within its boundaries, an urban centre of more than 25,000 population or, (ii) whether it was adjacent to a census division with a census metropolitan area. This dummy variable was used as an index of opportunities for off-farm work on the assumption that an urban labour market implies a host of industrial- and service-related occupational opportunities.

Results of our analysis can be stated briefly thus:

1. Again, variables pertaining to opportunities for off-farm work were more important than those pertaining to scale of farming.

2. Addition of a measure of education (i.e., proportion of operators with less than Grade 9 education) as an endowment index and the urban proximity dummy as an opportunity index (both had the expected sign) increased the D^2 value about 20%, but increased the classificatory power of the equation only slightly.

We also evaluated the relationship between our urban proximity dummy and a dummy for regional income returns in a number of correlation and regression analyses to be presented fully in the following chapter.⁸ In one case, use has been made of data for 252 census divisions for the low, medium and high income operator subgroups. Differentials in incomes within each subgroup have been evaluated independently in terms of the characteristics of each respective subgroup. In another case, the effects of each index on operator incomes have

See footnotes on page 164.

been evaluated at the provincial level for five educational and two occupational subgroups (i.e., $N = 5 \times 2 \times 10$ provinces = 100), as well as for four-income subgroups at the provincial level (i.e., $N = 4 \times 10$ provinces = 40).

Correlation results are presented in Table 4.10 and can be summarized as follows:

1. Almost all the correlations assume the expected sign and are statistically significant at the 0.01 and 0.05 levels.

2. Correlations are understandably low because the independent variables are dummy variables (0.1) with very little variation.

3. For all operators (Column 1), for operators of each low, medium and high income subgroup (Columns 2 - 4, 7 - 9), for operators of the education by occupational subgroups (Column 5), and for operators of the four income subgroups (Column 6), the dummy for proximity to urban areas and the dummy for regional wage and salary differentials are positively associated with farm performance. That is, returns to scale and risk of farming are probably higher and lower, respectively, given lower transportation costs to and high prices associated with proximity to urban centres, and higher over-all regional income levels with their higher prices for consumption of goods and services.

4. Employment and total income of each operator category (excluding the low income subgroup of Column 2) also appear to benefit from urban proximity and higher regional income returns.

5. That the low income operators (Column 2) do not appear to benefit from urban proximity may be attributable to the juxtaposition of the lower education and higher age levels typical of this farm subgroup with the higher education and lower age levels typical of urban populations. In other words, low endowments for off-farm employment may be intensified in the face of the typically higher endowments associated with urban labour markets. Another factor bearing on the observed negative correlation is that a significant share of the operators in this subgroup are of retirement status. As operators of retirement status typically have lower incomes and are known to leave rural farm areas for closer proximity to urban areas upon withdrawal from "active farming", the negative correlation seems to reinforce this possibility.

In sum, it seems reasonable to propose (i) that the urban proximity variable is relevant to evaluating opportunities for off-farm work, and (ii) that, given performance of the regional wage and salary differential, the regional-income-returns influence should be kept in our typology as well. As for the possible bearing of urban proximity on opportunities for off-farm work for low income operators, our correlation results are questionable since two concerns may be influencing the negative correlation. All this is to say that there does not appear to be sufficient justification to suggest revision of Type II currently assigned to small-scale operators with low endowments, located in high opportunity and low regional-income-returns areas.

TABLE 4.10. Correlations¹ Between Measures of Urban Proximity and Regional Income Returns, and Select Measures of Operator Income

Average income figures	Proximity to urban areas – (Dummy: 0 = not close, 1 = close)				
	All operators	Income subgroups			
		Low	Medium	High	
	1	2	3	4	
Farm sales	0.32**	0.18**	0.32**	0.06	
Capital value	0.25**	0.13*	0.24**	0.01	
Off-farm employment income	0.38**	- 0.13*	0.13*	0.11	
Total operator income	0.39**	- 0.24**	0.29**	0.14*	
Total operator family income	0.42**				
Average farm family income to average CMA family income	0.37**				
Percentage of operator's contribution to total family income	- 0.39**				
N =	252 ² CD's	252 ² CD's	252 ² CD's	252 ² CD's	
Regional income returns – (Dummy: 0 = low, 1 = high)					
Education subgroups	Income subgroups	Income subgroups			
		Low	Medium	High	
5	6	7	8	9	
Farm sales	0.27**	0.21**	0.16**	0.11	0.04
Capital value	0.43**	0.40**	0.16**	0.17**	0.08
Off-farm employment income	0.25*	0.08	0.08	0.18**	0.15*
Total operator income	0.24*	0.04	0.13*	0.31**	0.13*
Total operator family income					
Average farm family income to average CMA family income					
Percentage of operator's contribution to total family income					
N =	100 ³ five pairs of subgroups for each province	40 ⁴ four pairs of subgroups for each province	252 ² CD's	252 ² CD's	252 ² CD's

¹ For the correlations, ** = statistically significant at the 0.01% level, * = 0.05% level.

² Where N = 252, measures of each variable pertain to average characteristics of all operators or, where indicated, to average characteristics of each of three subgroups (low, medium or high income subgroups) of operators.

³ Where N = 100, measures of each variable pertain to average characteristics of operators of five educational subgroups x two occupational subgroups x 10 provinces.

⁴ Where N = 40, measures of each variable pertain to average characteristics of four income subgroups x 10 provinces.

4.9. Summary and Conclusions

In the interests of designing and evaluating a typology of low/high income farm operators, all aspects of this chapter have been concerned with (i) quantifying incomes and numbers of low versus high income operators and (ii) identifying and interrelating influences in a typology of the two subgroups. While some of the influences represented in our typology are rather obvious, in that they are well-known to economic theory, their empirical relevance for typologizing Canada's low versus high income farm operators is poorly understood. It is for this reason that we have not designed a complex untestable typology grounded in partial theories but have formulated a typology with origins in the empirical findings of previous chapters and the introductory sections of this chapter. With this in mind, we summarize findings which precede, are instrumental to, and result from the formulation, test and evaluation of our low/high income typology as follows:

1. Thirty-six point four per cent of Canada's census-farm operators receive less than \$2,000 farm income and less than \$2,000 off-farm employment income. On average, the total income of these operators from all sources is \$1,004. "Poor" operators are most prevalent in the Atlantic provinces of Newfoundland and Prince Edward Island, and the Prairie provinces of Manitoba and Saskatchewan and least prevalent in Ontario and British Columbia.

2. Off-farm employment income plays an impressive role in reshaping the "farm income distribution". For Canada, we observe a 30% reduction in the proportion of operators with total income less than \$3,000 when the effects of off-farm employment income are included. In some provinces, off-farm employment income has the effect of reducing operators in the bottom income category by up to 60% (for British Columbia). It is also obvious that non-employment income plays a uniformly small role in improving the "employment income distribution". The importance of off-farm employment income applies to operators regardless of their disaggregation by economic class or type of farm. Without doubt, access to sources of off-farm employment income is a major conditioner of low versus high incomes.

3. Dairy, poultry and fruit and vegetable farms not only have more equal "farm income distributions" than operators of other types of farms, but benefit more from off-farm employment income. However, type of farm is a minor conditioner of operator incomes as is farm operator residence.

4. Another reflection that off-farm employment income is important to upgrading farm operator incomes is that 39% of Canada's census-farm operators report wages and salaries as a major source of income. At the same time, approximately 12% of Canada's census-farm operators report non-employment income as a major source. As a large share of these operators are in the "retirement category" and as government transfer pension payments or pension funds resulting from investment sources are likely to be considerably lower, on average, than returns to labour force employment, another important conditioner of low versus high operator incomes concerns labour force status.

5. The correspondence between the proportion of Canada's census-farm operators who report wages and salaries as their major source of income and those reporting a non-farm occupation is relatively close. Accordingly, it is of some importance to note that those operators not only have higher incomes but have smaller farms, less total farm capital, lower agricultural sales, smaller farms and more days of off-farm work than their counterparts reporting farm occupations during census week. On average, they are also younger and more educated. In short, non-farm occupational involvement and higher human factor endowments in the form of younger age and higher education also emerge as notable conditioners of income.

6. An inconsistency in observation 5 above, however, is that farm sales of the non-farm occupational subgroup appear disproportionately low. The possibility that this subgroup of census-farm operators were particularly poor at farming or tended to understate profits due to high depreciation costs or accumulation of productive farm capital was ruled out. Rather, the possibility that 1% - 2% of Canada's census-farm operators were using their farms as a "tax write-off" was advanced and partially supported. While this consideration would certainly operate as a conditioner of observed or stated operator income, it is considered an "illegitimate conditioner" in that it biases income statistics downwards.

7 Of course, some farm operators are bound to experience severe losses due to weather variations, pestilence, diseased crops, over-production at times of downward shifting prices, mismanagement, etc. For example, of 36.6% of Canada's census-farm operators who report zero or loss farm income, about half had total incomes of less than \$3,000 and about a third of these had farms with sales in excess of \$10,000. Of these operators we also evaluated characteristics of those who had zero or negative income from all sources. We found 27,000 operators in this category who were (i) generally more reliant on farming as a means of generating income (i.e., fewer days of off-farm work), and (ii) operated relatively large-scale farms. In fact, they were second only to operators in the \$10,000 or more income category in terms of personal and farm factor endowments (i.e., age, education, farm capital value). These operators posed a problem in devising our typology in that we could not simply infer that, since their endowments are similar to the more prosperous operators, their losses are more representative of unfortunate epiphenomenal events, signifying that they should be excluded from our typology. Some proportion of these operators may have experienced losses due to a host of complex management and performance inadequacies. Possibly their income performance was poor because they did not have the foresight or the opportunity to offset possible farm losses through off-farm employment. Whatever the answer is, it was tempting to exclude this operator subgroup from the design and subsequent evaluation of our typology. To do so, however, might have been to deny that not only small farms are abandoned because of low income returns but some medium- and large-scale farms as well. In other terms, by excluding the "zero or loss group" we might have predetermined a larger chasm between characteristics of low and high income farm operators than really exists.

8. In proposing a typology of low versus high income farm operators we sought to reduce the numerous complexities and interactions among determinants of income into broad categories of influence which are easily borne in mind and which, for all practical purposes, permit generalizations about certain characteristics of persons if they are classified in specific cells of the typology.

9. Five major conditioners of total earned income have been distinguished. These are (i) human factor endowments conducive to higher productivity regardless of whether the job is self-employment farming or some off-farm occupation (e.g., younger age, higher education, diversity of occupational skills), (ii) scale of farm enterprise (e.g., characteristics bearing on economies of scale such as size, capital value, value of machinery, etc.), (iii) opportunities for off-farm work (e.g., demand for part-time labour as a means of supplementing low incomes), (iv) regional income returns (e.g., over-all prosperity of the region bearing on higher prices paid for goods and services and higher demand for labour given growth and development), (v) risk involved in self-employment activity (e.g., willingness of self-employed workers to adopt new techniques, risk of epiphenomenal losses more likely to be experienced by some types of farms than others, etc.).

10. Classificatory power of the typology was evaluated using a least squares discriminant analysis - a technique specifically designed to explore problems of classification by highlighting the significant differences among different groups of subjects. A number of applications of the discriminant technique and results of a correlation analysis were applied to evaluate indices of the various influences in the typology as descriptors of low versus high income operators. In order of importance, discriminators of operators with low versus high incomes were (i) indices to do with opportunities for off-farm work, (ii) labour force status, (iii) indices to do with endowments for off-farm work, (iv) indices describing scale of farming and (v) regional differentials in wage and salary remuneration.

11. While the high over-all classificatory power of our empirical representation of the typology indicates that major conditioners of low versus high operator incomes have been identified, room for improvement is obvious in conceptual clarity and the rigour with which influences in the typology were represented empirically.

FOOTNOTES

¹ Throughout this chapter, we deal with cash incomes only. No attempt is made to represent high and low incomes in terms of accumulated wealth or differentials in income in kind, etc. However, our definition of low income farm operators is compatible with low-level income cut-offs specific to rural farm residence that have been devised by Statistics Canada. See the discussion in Chapter 2, Section 3 on low-level income cut-offs.

² All analysis in this and the following chapter deals with all census-farm operators (residents and non-residents combined). We include some 40,000 non-resident operators here as we are shifting analysis away from the characteristics of families and family members residing on farms to individuals in charge of the daily operation of farms.

³ Average income from each component for census-farm operators is presented for Canada, provinces and census divisions in Appendix Table A.3.2.

⁴ The 1.5 - 2.0 ratio holds even when operators are disaggregated by economic class and type of farm (see Appendix Table A.3.3, Parts A and B).

⁵ For an introduction to the statistical underpinnings of discriminant analysis, see Rao (1952), Chakravarti, *et al.* (1967), Rao (1965).

⁶ All correlations and discriminant functions were performed using untransformed data as well. However, log-transformed data generally provided improved results.

⁷ In two-group discriminant analysis, one of the groups is labelled the low group, the other the high group. Thus, in our L/H, L/M and M/H pairs, L, L and M each represent the low group and H, M and H represent the high group in each respective pair.

⁸ The term "dummy" is used as an adjective of the word as the variable in question cannot be represented as a continuous variable. Rather, it is represented as a discrete variable (i.e., male versus female). As a crude way of quantifying the significance of the discrete variable on, say, levels of earned income, a value of 0 or 1 is assigned to each group (i.e., 1 is assigned to males, 0 = females). This has the effect of partitioning observations into one of two groups (much like in a cross-tabulation) where each group is believed to be significantly different from the other as an influence on the "dependent variable" (e.g., level of earned income).

CHAPTER 5

DETERMINANTS OF FARM PERFORMANCE

5.1. Introduction

This chapter examines the relationship between area variations in a number of measures of farm performance and areal variations in farm and farm operator characteristics. First, we analyze areal variations in gross farm sales. Second, we discuss "net self-employment farm income" as a measure of farm performance, how reported "zero or loss" farm income undermines this measure, and the extent to which the "zero or loss" problem can be "explained" by the presence of operators with off-farm occupations. As a final measure of farm performance, we evaluate variables associated with differential rates of farm "abandonment".

The balance of the chapter (i) looks at the human side of the farm performance equation and asks whether intervention in the distribution of farm operators by education could be expected to enhance returns to farming, and (ii) seeks to identify census divisions where small, seemingly unviable and inadequate farms are most prevalent. Conclusions to this chapter are reserved for the following summary and concluding chapter.

Admittedly, our ability to identify specific determinants of farm performance is seriously hampered by two major data limitations. The first has to do with the aggregative nature of our data. Though we would prefer to conduct our inquiry using data on "individual" farms and farm operators, census confidentiality rules do not permit this approach. Rather, data on farms and farm operator characteristics are aggregated. This means that our analysis is restricted to areal units (census divisions), and that interpretation of correlations is based on average values for these units. Though problems of ecological correlation may tend to distort or camouflage subtleties in bi- and multi-variate relationships as a result, there can be little doubt that the areal approach is still useful towards unveiling the broad web of factors which condition differential levels of farm performance.

The second problem which is likely to undermine the rigour of our evaluation has to do with variables which are known to influence farm performance but lie outside census measurement. For example, important considerations not represented in the 1971 Ag-Pop data base include:

- (a) differentials in managerial skills attributable to individual ability versus attained education, risk proneness, etc.;
- (b) differential impact of weather variations, pestilence, luck, etc., on production;
- (c) misreporting of indices of farm production given possible use of farms as a tax write-off;

- (d) underutilization of farm holdings in cases where farms are operated largely as hobby farms;
- (e) differentials and fluctuations in prices (i.e., related to demand and supply) for farm products; and
- (f) whether the off-farm work of operators marries well with shifts in the capital/labour ratio on farms, or whether such activity is detrimental to full returns to the farm resources owned/rented.

The combined effect of the influences mentioned above also threatens the utility of an attempt to identify determinants of farm productivity. In other terms, it is important to keep in mind that evaluation of many farm productivity questions simply lies outside the realm of possibility, given limited accessibility to and the shortcomings of census data. Again, this implies that our use of multi-variate statistical techniques will be limited largely to ordering the confusion among a large number of possible influences in area variations in farm performance. As our analysis continues to be largely exploratory, this means that we will scrutinize relationships between a large number of farm-input variables and will summarize those which are most highly correlated with area variations in farm performance.

5.2. Correlates of Differential Farm Sales

To evaluate differentials in farm performance, we use gross farm sales as a measure of output. Gross farm sales figures, as reported by the farm operator, pertain to the sum cash value of all agricultural goods produced and sold at the market. Aside from errors due to recall, this statistic may be one of the most accurate census-farm income figures. For example, as sales figures do not take into account depreciation allowances they are not likely to suffer from contrived depreciation allowances or farm investments aimed at building up farm capital stock. Also, as farm sales are represented by a gross figure, there would seem to be little advantage in misreporting sales for tax reasons. The only apparent problem in using sales figures is that they do not represent farm production that has been consumed as income in kind. Thus, the performance of small-farm holdings may be underemphasized. Further, unsold surpluses, such as stored grains or cattle withheld from slaughter, will not be reflected in farm sales.

Evaluation of 1970 - 71 farm performance as represented by gross farm sales employs (i) regression techniques, and (ii) a large set of variables which subsume both those represented in our historical analysis, those used in our analysis of total farm family incomes, and those used in the discriminant analysis of low/high operator incomes.¹

See footnotes on page 199.

One way of accounting for areal variations in gross farm sales would be to use value of select farm expenditures as a summary index of farm magnitude. Correlations between the two variables are likely to be high as expenditures measures the magnitude of purchased farm inputs at time t which bear on output for sale at time $t + 1$. Indeed, a high degree of correlation between the two variable is observed ($r = 0.80$). This applies regardless of whether we use our aggregate data for 252 census divisions, or disaggregate farms into three income subgroups for each census division (as in Chapter 4, discriminant analysis, where $N = 3 \times 252 = 756$).

Yet, the select expenditures variable has a major shortcoming in that it does not represent the role played by fixed capital. While "census-measured select farm expenditures" includes cash outlays for farm labour, animal feed, rental of land and fertilizer, etc., it does not represent the stock of owned acreage, animals, farm buildings or machinery, etc. Thus, while aggregate expenditure measures may be highly and positively correlated with such variables as "weeks of hired farm labour", "farm area rented", etc., we cannot assume that the magnitude of expenditures is highly correlated with the magnitude of farm stock (i.e., meaning that expenditures are not likely to adequately represent or subsume magnitude of fixed capital). This point is illustrated in correlations between "value of select farm expenditures" and (i) farm capital value = 0.44, (ii) farm area = 0.22, and (iii) value of farm machinery = 0.28. While a low correlation implies the variables may be independent of each other (a very desirable property for their inclusion in regression analysis), there is an additional problem of measurement. Unfortunately, each variable — as measured by the census — overlaps with the other; for example, value of farm capital includes value of land and buildings rented, while value of select farm expenditures includes cost of rented land and buildings, plus taxes on owned property.

With the above in mind, variations in farm sales at the census division level have been evaluated, using more specific measures of farm magnitude. For example, capital deepening, increased emphasis on meat production, decline of labour inputs, increase in land rental, and economies of scale were most highly correlated with both agricultural sales per farm (and per acre) and gross value of agricultural output per farm (and per acre) over the 1911-71 period. Also important were new feeds, seed and fertilizer in Canadian farming and the fast growth of these inputs over the last decade or so (e.g., index for feed and seed; 1950 = 105, 1968 = 180; index for fertilizer and limestone, 1950 = 105, 1968 = 330).² These are the kinds of consideration to be represented in our regression analyses. We will also evaluate variables pertaining to type of farm and operator characteristics such as "occupation during census week", education, family size (as an indicator of availability of unpaid family labour), and age. (All variables listed in Table 3.7, footnote 1.)

See footnotes on page 199.

Table 5.1 presents our best fit regressions for Canada and three contrived regions. This means that, from a pool of a large number of possible correlates of gross farm sales, the variables presented in Table 5.1 combine to account for more variation in farm sales than combinations of any of the other remaining variables. As in Chapter 3, performing regressions for each region simply represents a means of checking on the consistency of findings and whether the error term varies substantially (e.g., as a function of unmeasurables such as weather, etc.).

TABLE 5.1. Regression Results for Analysis of Farm Sales, Canada and Contrived Regions, 1971

Independent variables	Regression coefficient	Standard error of the regression coefficient	Order	Regression coefficient	Standard error of the regression coefficient	Order
			Canada		Mid-west	
Average capital value	0.528	0.034	1	0.674	0.128	1
Average number of cattle	0.121	0.028	5	0.024	0.033	-
Average number of hens	0.177	0.016	3	0.142	0.027	2
Percentage of operators with off-farm occupations	- 0.274	0.039	4	- 0.131	0.078	-
Percentage of operators with more than Grade 12 education	0.042	0.020	6	0.061	0.048	-
Average family size	0.133	0.069	-	0.343	0.250	-
Percentage of farm area fertilized	0.275	0.020	2	0.117	0.030	3
R ²		0.84			0.94	
N = number of census divisions		252			53	
F ratio		152.91			92.212	
Intercept		- 0.582			- 0.654	
			Mid-east		East	
Average capital value	0.569	0.073	1	0.637	0.232	1
Average number of cattle	0.153	0.038	4	- 0.136	0.111	-
Average number of hens	0.217	0.022	3	0.076	0.037	2
Percentage of operators with off-farm occupations	- 0.250	0.072	5	- 0.338	0.204	-
Percentage of operators with more than Grade 12 education	0.056	0.024	6	0.010	0.057	-
Average family size	0.177	0.084	7	0.295	0.206	-
Percentage of farm area fertilized	0.232	0.030	2	0.151	0.068	3
R ²		0.874			0.805	
N = number of census divisions		155			44	
F ratio		112.196			18.05	
Intercept		- 0.781			0.224	

On the whole, average value of farm capital is the most significant correlate of differentials in magnitude of farm sales. As the coefficients have been evaluated using log-normal regressions, we can generalize that farm sales elasticity with respect to capital value is about twice that of any other variable in the equation. On the other hand, if capital value is represented alone in the regression (not reported in Table 5.1), the elasticity is slightly above 1.0.

In terms of statistical significance, elasticity, and contribution to R², the variables "proportion of farm area fertilized" and "average number of hens per farm" make the next largest contribution in the equation. Neither finding is

particularly startling, as it is well-known that fertilizer has played an important role in Canadian farming and that the farms involved in production of poultry, dairy and cattle products have enjoyed higher returns.

With respect to the remaining variables, it is difficult to generalize about their relative bearing on farm sales except that each consistently demonstrates the expected sign. The relationship between proportion of operators with an "off-farm occupation" and "farm sales" is, as expected, negative (i.e., expected given findings and discussion in Chapter 4), although it fails to be significant for the mid-west and eastern regions. Average family size has the expected positive effect (i.e., as a source of cheap or unpaid family labour), but it is statistically significant for only one region. Finally, the positive bearing of "number of cattle per farm" and "operators with greater than Grade 12 education" on "farm sales" accords with physical and human capital expectations, though statistical significance and elasticities are largely uneven among regions.

In effect, the variables reported in Table 5.1 are those which (i) provide the best fit regression and (ii) are consistent with respect to sign and elasticity.³ This does not mean, however, that other variables representing effects similar to those in Table 5.1 are not also correlated with farm sales. Those reported in Table 5.1 are simply more highly correlated. In addition, to a large extent they subsume variables measuring similar farm or farm operator characteristics.

Additional correlations of some interest are between "farm sales" and "operator's education" and "type of farm". A rise in the "proportion of operators with less than Grade 9 education" does not seem to be associated with the level of "farm sales". One reason may be that a large proportion of farm operators in each census division have less than Grade 9 education, meaning that there is little variation in this independent variable. However, this is less of a statistical shortcoming than an empirical fact. Coupled with the low elasticity associated with "proportion of operators with greater than Grade 12 education", this finding suggests that variations in education play a small role in average levels of farm sales. With respect to "farm type" larger proportions of dairy, and poultry farms are positively associated with average "farm sales", while larger proportions of wheat farms are negatively correlated with sales (finding based on the three income subgroups). However, the latter finding could be due more to prompting by the federal government to reduce crop production during the summer of 1970 than to any particular inadequacies attached to the performance of wheat farms *per se*.

5.3. Net Self-employment Farm Income as a Measure of Farm Performance

Of the four major income variables used in this study (farm sales, net farm income, off-farm income, total income), "net farm income" is likely to be the

See footnotes on page 199.

most inaccurate. Unlike farm sales, it includes depreciation allowances (some of which could be contrived), as well as investments in capital stock. Unlike "farm sales", it is likely to correspond with registered taxable income (i.e., reported in April of the same year), which, for obvious reasons, may have been under-reported. Unlike highly monitored off-farm wages and salaries (i.e., logged by employers for preparation of federal income tax T4 slips), statements of farm earnings are left up to a diversity of individual skills, procedures and standards. Finally, "net farm income" is likely to fluctuate most over time; if lower or higher sales do not affect the magnitude of net farm income then lower or higher depreciation costs or investments probably will. In contrast, the flow of off-farm income is likely to be much more constant over time as wages are usually higher (i.e., given minimum wage laws and the role of unions). All this is to say that variance of "net farm income" figures between time t and $t + n$ are likely to be much higher than other income measures. The effect of estimating regression coefficients is that they are likely to be biased and the error term is likely to be large. In sum, net farm income data are extremely difficult to interpret in relation to the stock of farm and farm operator assets. One is never sure what one is working with; aggregations of net farm income figures at the census division level may be representative of a hodge-podge of ambiguity and errors.

For the reasons above, it seems of little use to present detailed regression findings for an analysis of "net farm income". While most of the variables in the regressions were also similarly correlated with "net farm income" (as with farm sales) their R^2 values were, on average, 25% - 30% less. The major difference within each regression was in the statistical significance and elasticity of the "proportions of operators with off-farm occupations". In the former case, "proportions of operators with off-farm occupations" had a marginally negative effect on net self-employment farm income; in the latter case, the same variable had a negative effect of high significance as well as a high elasticity (-1.55). The implication for our areal analysis is simply that, when farm performance in any particular area is measured by gross "farm sales", its behaviour can be "explained" more adequately using characteristics of the farm only, than can farm performance when measured by "net farm income". It would seem that the major difference lies in the greater negative impact of off-farm occupational involvement on net income than on gross "farm sales".

This finding seems to bring us back, full circle, to questions about the bearing of reported "zero or loss" farm income on farm sales: net farm income relationships. In Chapter 4, we suggested that operators with non-farm occupations and off-farm employment incomes have greater incentive to use their farms as tax write-offs, etc., meaning that zero or loss farm income would tend to be reported more frequently. Of course, zero or loss farm income could also be more highly associated with operators involved in off-farm occupations given that some of the farms involved would be very small, mainly being held as hobby farms or as an investment in real estate. Also, if operators with off-farm occupations and stable employment-income sources are more prone to take risks, this would also explain the higher prevalence of farm loss. That is, farm operators with relatively

high, constant, if not guaranteed, off-farm income, could be in a position to risk farm losses without worrying about substantial reductions in their economic well-being.

From a policy viewpoint, it seems important to quantify the extent to which links exist between operators reporting "off-farm occupations" and a tendency to report "zero or loss farm income". If areas with low average net farm income are populated largely by small-scale farm operators who report (i) off-farm occupations during census week and (ii) zero or loss farm incomes, then there is every reason to assume that these farm areas are not as badly off as they seem. Operators reporting off-farm occupations typically derive higher incomes from that source than from farming.

To evaluate the question raised above, we first identify factors associated with areas in which larger proportions of their operators are involved in off-farm work. We then evaluate whether the presence of "off-farm occupation" and its correlates is also correlated with a propensity to report "zero or loss farm income".

Table 5.2 reveals that a larger proportion of "operators with an off-farm occupation" (our dependent variable) is consistently associated with larger proportions of farms with sales less than \$5,000.⁴ Note that the sales variable is not only the most important in the regressions across regions but it demonstrates a relatively high elasticity. Given that non-farm occupations pertain to "operator's" activity during a highly active farm period (June 1 - 9), there is little reason to suspect that the operators in question are involved in non-farm occupations only as a temporary means of offsetting poor farm returns. That is, it seems reasonable to assume that the variable "farms with sales less than \$5,000" is an adequate measure of small-scale farming and that those reporting off-farm occupations during census week are likely to have only a small stake in farming. In support of this claim, we also found that the proportion of "operators with off-farm occupations" is negatively correlated with average "proportion of farm area under crops" (-0.50), "average area fertilized" (-0.58), "average number of cattle" (-0.42), "average number of tractors per farm" (-0.52), "average value of machinery" (-0.55), "average value of land rent" (-0.50), and "average cost of fuel and oil" (-0.49).

The two education variables take on the expected sign, though only the proportion of "operators with greater than Grade 12 education" is statistically significant and, at that, it is significant only for Canada and the mid-west. Over-all, the R^2 value is respectable, with poorest performance for the eastern region.

We now turn to analysis of propensity to report "zero or loss farm income". Again, numerous regressions have been performed, drawing on a large number of variables toward finding a "best fit equation" (i.e., maximum predictive capacity).

See footnotes on page 199.

Of course, the inclusion of "proportion of operators with non-farm occupations" in the regressions implies that its correlates (as in Table 5.2) are to be excluded from the analysis.

TABLE 5.2. Regression Results for Analysis of Off-farm Occupation, Canada and Contrived Regions, 1971

Independent variables	Regression coefficient	Standard error of the regression coefficient	Order ¹	Regression coefficient	Standard error of the regression coefficient	Order ¹
	Canada			Mid-west		
Percentage of farms with sales less than \$5,000	0.705	0.032	1	0.805	0.085	1
Percentage of farms with area less than 70 acres	0.308	0.015	4	- 0.010	0.041	-
Percentage of operators with less than Grade 9 education	- 0.053	0.032	-	- 0.441	0.290	-
Percentage of operators with more than Grade 12 education	0.067	0.014	2	0.146	0.128	-
Proximity to urban area	0.127	0.043	3	0.185	0.092	2
R ²		0.767			0.795	
F ratio		161.820			36.300	
N = number of census divisions		252			53	
Intercept		0.702			0.805	
	Mid-east			East		
Percentage of farms with sales less than \$5,000	0.630	0.048	1	0.785	0.148	1
Percentage of farms with area less than 70 acres	- 0.006	0.022	-	- 0.030	0.048	-
Percentage of operators with less than Grade 9 education	- 0.142	0.101	-	- 0.056	0.038	-
Percentage of operators with more than Grade 12 education	0.070	0.020	2	0.026	0.037	-
Proximity to urban area	0.069	0.053	-	0.205	0.121	-
R ²		0.673			0.456	
F ratio		61.403			6.376	
N = number of census divisions		155			44	
Intercept		0.714			0.360	

¹ Stepwise regression results.

Table 5.3 presents the results. As expected, the off-farm occupation variable is highly significant. (That it fails to be statistically significant in the eastern region will be discussed later.) Although its elasticity is not as high as we might have expected, all indications are that it is an important key to understanding the prevalence of net farm zero or loss income. Additional correlations in support of our claims are between "average proportion of operators reporting zero or loss farm income" and "proportion of farm area under crops" (-0.42), "average crop area" (-0.46), "average farm area fertilized" (-0.39), "average number of cattle" (-0.30), "days of off-farm work" (0.71), "average number of tractors per farm" (-0.33), "proportion of operators with greater than Grade 12 education" (0.31) (i.e., all indications of lower involvement in farming).

TABLE 5.3. Regression Results for Analysis of Operators Reporting Zero or Loss Farm Income, Canada and Contrived Regions, 1971

Independent variable	Regression coefficient	Standard error of the regression coefficient	Order ¹	Regression coefficient	Standard error of the regression coefficient	Order ¹
	Canada			Mid-west		
Percentage of operators with off-farm occupations	0.471	0.620	1	0.482	0.072	1
Average family size	- 0.447	0.075	2	- 0.402	0.111	2
Value of select farm expenditures . . .	0.085	0.020	3	0.138	0.038	3
R ²	0.064			0.825		
F	108.05			77.11		
N	252			53		
Intercept	0.501			0.421		
	Mid-east			East		
Percentage of operators with off-farm occupations	0.633	0.094	1	0.274	0.163	-
Average family size	- 0.333	0.099	3	- 0.071	0.246	-
Value of select farm expenditures . . .	0.135	0.029	2	0.086	0.073	-
R ²	0.701			0.09		
F	88.02			1.01		
N	155			44		
Intercept	0.345			0.780		

¹ Stepwise regression results.

Two other significant variables in the regressions are "value of farm expenditures" and "family size". In the former case, it is reasonable to expect that higher levels of expenditures would be associated with greater risk of "zero or loss farm income" as risk increases with higher operating costs. At the same time, however, high levels of expenditure would be positively correlated with "zero or loss" net farm income if such expenditures reflect capital-deepening strategies or expansion of real estate. As for "family size", our interpretation is more of a hypothesis for further evaluation than a conclusion. It seems reasonable to claim that, as larger families provide a potentially larger source of unpaid family labour, and as cash wages represent an important farm expenditure, reduction of such expenditures through the use of farm family labour will tend to reduce the risk of farm loss.

Why the regression presented in Table 5.3 performs so poorly for the eastern region, it is difficult to say. One problem is that the proportion of "operators reporting zero or loss" is much higher and values are considerably more homogeneous across census divisions in Newfoundland, Prince Edward Island, Nova Scotia and New Brunswick. A second reason is the fact that scale of farming is generally much smaller in these provinces, meaning that the proportion of "operators in off-farm occupations" is relatively high in all census divisions in those provinces. A third reason is that farm operators in the eastern region are generally older and relatively large proportions report "no occupation" (i.e.,

implying retirement), while still reporting "zero or loss from farming". Thus, for the eastern region, our regressions are confounded on two counts: one has to do with a lack of variance in our dependent variable, the other has to do with inability to measure a variable which affects the magnitude of our dependent variable.

As off-farm occupations are clearly important in understanding the prevalence of net farm "zero or loss income", it may be instructive to take a further look at distributions of operators and the characteristics of their farms that are involved in various types of off-farm occupations. In Chapter 4, we have already discussed general characteristics of these operators and have shown that while their reported net farm incomes are low (in relation to those reporting farm occupations during census week), the characteristics of their farms suggest earnings should be higher. To follow up on this finding, we disaggregate census-farm operators reporting off-farm occupations by type of occupation. In cases where the off-farm occupation implies that the operator is truly a marginal farmer, we are interested in finding out whether characteristics of their farms remain indicative of higher net self-employment farm earnings.

This question is evaluated in Table 5.4, using select farm and farm operator characteristics of a number of occupational subgroups (i.e., occupation reported during census week). As noted previously, we observe that average net farm incomes are lower where there are higher average off-farm employment earnings and higher educational levels. Needless to say, this relationship is also observed for those occupational categories (managers, teachers, health personnel) that are more likely to be full-time endeavours.

Now, the kind of pattern that suggests that "zero or loss net farm income" is not compatible with characteristics of the respective farm can be illustrated by comparing the "farming" and "managerial and administration" occupational subgroups. Using the "farmer" group as our referent, it seems reasonable to argue that the following farm characteristics of the "managerial and administration" group are not commensurate with average net farm income of -\$343. The characteristics to note are:

- (a) average farm size of 312 acres,
- (b) average capital value of \$77,900,
- (c) average value of machinery and equipment of \$8,800, and
- (d) average value of select farm expenditures of \$6,530.

In this case, it seems more reasonable to interpret a "loss" as the after-effect of expenditures on capital deepening (particularly expansion of real estate).

As for the remaining occupational groups, there seems no reason to expect that the rationale above is not applicable as well. If there is a difference, it is likely to lie in smaller expenditure allocations for capital deepening, etc., and thus a lower ratio of expenditures to sales. One reason may be that, because members of

**TABLE 5.4. Select Average Census-farm and Census-farm Operator
Characteristics by Select Occupational Subgroups,
Canada, 1971**

Occupation	Number ¹	Age	Years of school- ing	Net farm income	Off-farm employ- ment income
	1	2	3	4	5
	000's			dollars	
Farming	240.1	49	8	2,335	1,410
Managerial and administra- tion	3.7	47	12	- 343	12,406
Teaching	1.9	41	15	- 522	9,133
Medicine and health	1.0	46	13	- 646	12,954
Clerical	4.2	46	10	- 17	5,261
Sales	7.2	45	10	238	6,439
Other primary	5.2	44	8	320	4,850
Processing	6.3	44	8	271	5,670
Machine production and fab- ricating	12.1	43	9	99	5,938
Transportation	12.1	43	8	283	5,169
Construction	17.2	45	8	229	5,301

¹ Totals do not equal 366,000, as we consider select occupations only.

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

**TABLE 5.4. Select Average Census-farm and Census-farm Operator
Characteristics by Select Occupational Subgroups,
Canada, 1971 - Concluded**

Occupation	Total income	Per capita house- hold income	Acres	Capital value	Value of ma- chinery and equip- ment	Value of selected expendi- tures
	6	7	8	9	10	11
	dollars			dollars		
Farming	4,393	1,636	572	770	127	513
Managerial and administra- tion	13,325	3,334	312	779	88	653
Teaching	9,331	3,140	260	574	68	299
Medicine and health	13,417	3,404	246	623	76	366
Clerical	5,918	2,232	216	466	63	301
Sales	7,494	2,494	296	588	85	453
Other primary	5,718	1,539	289	330	61	164
Processing	6,436	1,702	179	404	56	313
Machine production and fab- ricating	6,507	1,709	193	416	60	206
Transportation	5,930	1,611	270	427	73	224
Construction	6,085	1,633	214	393	56	171

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

these occupational groups have lower over-all earnings, they have less to invest in their farm capital stock. Another reason may be that members of these occupational groups are less likely to devote a majority of their time to off-farm work than their more highly skilled counterparts. Thus, they may devote more time and energy to the operation of their farm assets towards generating a profit. A third reason, as noted earlier, may be that, since over-all off-farm earnings are considerably lower among members of these occupational groups, the motivation to underreport net farm income toward reducing taxes on their over-all income may be less.

If the inferences drawn above are correct, it would seem highly relevant for statistical and policy purposes to be on the alert for areas with significant proportions of census-farm operators engaged largely in off-farm occupations. From a statistical perspective, the presence of these operators tends to obliterate meaningful interpretation of farm asset, input and output relationships. That is, farm performance as measured by "farm sales" or "net farm income" often does not seem commensurate with farm capital stock. Clearly, the presence of an off-farm occupation seems to be an intervening variable which, for reasons enumerated above, exercises an independent influence on indices of farm performance.

From a policy point of view, the presence of these operators may bear inaccurately on inferences about returns to farming *per se* and what seems possible (in terms of performance), given the profile of farm assets. Isolating specific areas where these operators proliferate is no easy matter. In 1971 these persons operated 15.2% of Canada's farm land, 18.6% of Canada's farm capital, 14.2% of Canada's total farm sales, yet only 2.2% of Canada's total net farm income (data from the 1971 Census). In Nova Scotia the proportions are considerably higher, while in Canada's "purest" farm province - Saskatchewan - these operators still operate 10.8% of the province's farm land. If there is a lesson at all to be learned by policy-makers, it is that, before judging the actual and potential prosperity of farm areas, it will be important to:

- (a) identify the extent to which operators with off-farm occupations report "zero or loss" incomes when characteristics of their farms indicate either that farm income should be higher or that the operator's wealth has been growing due to capital deepening; and
- (b) identify the extent to which reported "zero or loss" farm income is related to differentials in levels of off-farm earnings that exist between areas of varying prosperity.

5.4. Reduction in Farm Numbers

Another indication of farm performance is the rate at which farming has been abandoned as a means of earning a living. We have already established that there is non-parity of incomes between agricultural and non-agricultural types of

work. To a large extent this is due to the prevalence of small-scale farms with poor prospects of viability, given increasing pressures of cost-price squeeze, etc. The rate at which farms decline in any particular area will likely be a function of (i) average level of returns to farming *per se* (a negative effect), (ii) the proportion of small-scale farms in the area (a positive effect), (iii) prospects of off-farm work as a means of supplementing low farm incomes (a negative effect), (iv) opportunities to obtain full-time jobs which pay better than farming (a positive effect), (v) proportion of operators in the older ages, implying retirement and withdrawal from farming (a positive effect), and (vi) government intervention to purchase small farms, relocate farm families to off-farm locations and sponsor or aid in consolidation of farms (a positive effect).

In the regression analysis presented in Table 5.5, we evaluate variations in the ratio of 1971 to 1966 census-farms per census division in terms of 1971 aggregate farm and farm operator characteristics of the census division. Admittedly, it would have been preferable to use 1966 - 71 change variables but the 1966 Census of Agriculture data set was severely incomplete in comparison to the 1971 Ag-Pop data. Needless to say, this implies a simultaneous equations bias, as well as the need to assume that differences between census divisions during 1966 - 71 (the time during which farm abandonment occurred) are adequately reflected in the differences existing in 1970 - 71.

TABLE 5.5. Regression Results for Analysis of Reduction in Farm Numbers, Canada, 1971

Independent variables	Equation 1			Equation 2		
	Regression coefficient	Standard error of the regression coefficient	Order	Regression coefficient	Standard error of the regression coefficient	Order
Percentage of non-resident operators . .	0.077	0.013	2	0.064	0.013	2
Percentage of owner operators	0.189	0.049	5	0.282	0.065	3
Percentage of farms with sales less than \$5,000	- 0.190	0.046	3	- 0.140	0.040	4
Percentage of operators with more than Grade 12	0.030	0.010	6	0.022	0.011	9
Percentage of operators working less than 40 weeks per year	- 0.040	0.014	7	- 0.024	0.012	8
Percentage of operators aged 65 and over	- 0.176	0.022	1	- 0.173	0.021	1
Average operator farm income	0.108	0.024	4	1	1	-
Percentage farm area rented	1	1	-	0.070	0.019	5
Average number of cattle per farm . .	1	1	-	0.056	0.017	7
Value of farm machinery	1	1	-	0.088	0.036	6
R ²		0.61			0.67	
F		31.2			29.2	
N		252			252	
Intercept		- 0.465			- 0.292	

1 Indicates that the variable was not included in the equation.

All variables relating to farm and farm operator characteristics were evaluated towards producing a best fit regression. Our analysis was performed at the national level only (N = 252). In addition, towards representing urban pulls in decisions to leave farming, we evaluate (i) an urban proximity variable as a proxy for "amenities and off-farm work opportunities", and (ii) the census division ratio of "average urban family income to average farm family income". Of course, both variables are expected to bear positively on reduction of farm numbers.

Results of our analysis (presented in Table 5.5) can be summarized as follows:

1. The most significant variable in the regressions relates to the age profile of the census division. "Proportion of operators aged 65 and over" reflects retirement.

2. "Proportion of operators who are non-residents" is second in statistical significance although its elasticity is small. Non-residency seems to be on the increase both absolutely and relatively for a small subgroup of Canada's census-farm operators and it may represent an important means of coping with poor farm performance. That is, these operators may have the skills to obtain higher paying jobs and may have to live in non-farm areas, yet may wish to, and are now able to, hold onto and operate their farm holdings. Of course, non-resident operators will also consist of those who live and work in non-farm areas but who purchase small hobby farms of farm land for real estate purposes.

3. The negative impact of "proportion of operators with off-farm occupations" (third in over-all importance) on the decline in farm numbers is expected since many operators owning small unviable farms probably seek off-farm work as a means of keeping their farms "afloat" or as a means of raising living levels. In other words, the combination of small-scale farm and part-time farm operator may represent a major structural adjustment in Canada's farm sector.

4. The larger the proportion of outright owners, the lower the reduction in farm numbers tends to be. Although outright owners are more likely to operate smaller scale, less profitable farms than those in mixed tenure arrangements, ownership also implies inertia. Ownership has been observed to exert a negative influence on migration in a number of contexts because (i) it implies ties to an area in terms of duration of residence, friends and simple "belonging through owning", (ii) it implies allocation of expenditures on farm holdings over time towards improving residential quality and, (iii) it implies that, should an owner attempt to sell his capital on the market but fail to obtain the desired price, he may be reluctant to leave.

5. According to Equation 1, "higher average net farm income", and according to Equation 2, three strong positive correlates of farm income (i.e., area rented, number of cattle, etc.) are positively associated with the 1971 to 1966 farm ratio. These variables all carry the expected sign and pertain to farm prosperity. The positive association between "average farm area rented" and

stability in farm numbers is expected since rental of land is interpreted as a move toward expanding working capital (i.e., correlation with sales = 0.41; value of machinery = 0.65; off-farm occupation = -0.24).

6. Finally, the larger the "proportion of operators with greater than Grade 12 education", the smaller the reduction in farm numbers. This finding is expected on the ground that more educated farm operators are likely to do better at farming if they are involved in farming full-time. Also, this variable undoubtedly relates to those who have off-farm jobs and desire to keep their farms as hobby farms, as a real estate investment, etc.

5.5. The Human Side of the Farm Performance Equation

Most of the correlations involving measures of farm performance and of physical capital have exhibited expected signs and are relatively easy to interpret in the light of theoretical underpinnings to do with capital intensive production, etc. Although there is every reason to expect that human capital should make an important contribution to farm performance as well, many of our results are ambiguous and suggest that the relationship is weak. For example, in previous chapters we observed a positive relationship between educational levels and off-farm income, but almost no relationship between education and net self-employment farm income. The apparent non-relationship between education and farm income was attributed to problems of measuring income from farming, possible misreporting of this income figure by more highly educated operators, etc.

While our regression results indicate that farm sales are positively related to higher proportions of operators with Grade 12 plus education results are also questionable due to (i) problems or inconsistency of measurement, and (ii) confounding of results due to peculiarities of operator subgroups that have not been adequately identified. That is, we have often used proportions to measure education profiles (e.g., proportion of operators with less than Grade 9 education), when it would have been desirable to use some cumulative measure of average education. Nor have we taken into account the greater propensity to report "zero or loss" net farm income by those highly educated with off-farm jobs. Thus, the bearing of education on farm performance among those largely dependent on farming for a livelihood has been obscured by pooling all farm operators, regardless of the degree of their economic reliance on their farms.

All this is to say that the question of whether upgrading the educational distribution of farm operators would serve to improve returns to farming remains largely unanswered. Of course, in theory it is generally accepted that higher education is not only expected to improve "worker and allocative effects" (see Shaw, 1974b), but lack of education may shackle natural ability, given that individuals are often screened for particular jobs according to educational attainment (i.e., a credential effect). On the basis of the extensive work in this

field it seems reasonable to expect that the most immediate benefits of education in self-employment farming are likely to be related to improved management through improved "worker and allocative effects", whereas the most immediate benefits to off-farm wage and salary employment are likely to be related to satisfying initial credential requirements (see Griliches and Mason, 1972; Hanson, Weisbrod and Scanton, 1970; Thurow and Lucas, 1972).

At the same time, from a policy point of view, there is a high degree of consensus that the most modifiable human capital endowment is "education". While combinations of additional effects such as sex, age, ethnic status, natural ability, physical health, and personality traits such as motivation, drive, risk aversion, mental health, discrimination, etc., also have an important bearing on human factor endowments, many of these attributes are out of the reach of the policy-maker. About the safest generalization the policy-maker can make is that since formal education in Canada has been highly systematized with the objective of making it available to all, policy intervention in the quality and quantity of education is likely to have a greater impact on the over-all profile of human capital than intervention in any other human capital dimension.

The question posed for this section is "whether upgrading of the farm operator educational distribution could be expected to raise levels of farm performance as reflected in gross farm sales, etc.". Toward a partial answer, we classify operators according to occupation during census week and then calculate average characteristics of their farms according to educational level. Chart 5.1, Part A reveals that higher levels of education are clearly related to higher farm sales regardless of operator's occupation during census week. The major difference between the two occupational groups in level of sales is expected, since the latter group is much less involved in operation of their farm holdings which, on average, are also smaller farm enterprises. Those with university degrees have been omitted from this analysis (Part A), because the credibility of their very low (zero or negative) net farm income is suspect for reasons noted previously.

There is generally an indication of a positive relationship between education and net farm income for the "farmer" occupational group and an almost converse relationship for the "non-farm" occupational group (data not shown here). The latter finding is consistent with our previous argument that the higher the off-farm income, the greater the incidence of low net farm income is likely to be. That is, as those with higher levels of education are likely to earn more off-farm income than those of lower educational attainment, they may be motivated to report lower net farm income. On the other hand, with higher incomes to be had at off-farm work and higher incomes to be had by the more highly educated, these census-farm operators may have income to invest in their farm capital stock which is disproportionate to that implied by their farm sales minus their farm expectations. We could even speculate that these operators may be poor farm managers (possibly new entries in farming) and that they may tend to experiment with expensive breeds, invest far too much in machinery and other gadgetry which may be depressing net farm income.

Chart 5.1

Average Farm Sales and Average Capital Value of Farms Classified by Farm/Non-farm Occupations During Census Week and Level of Education of Census-farm Operators, Provinces, 1971

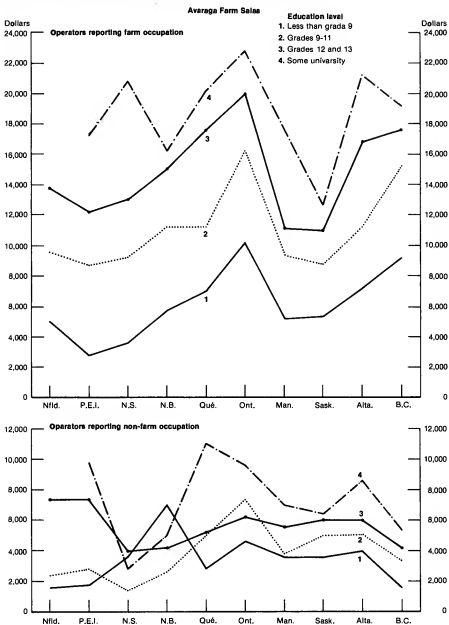
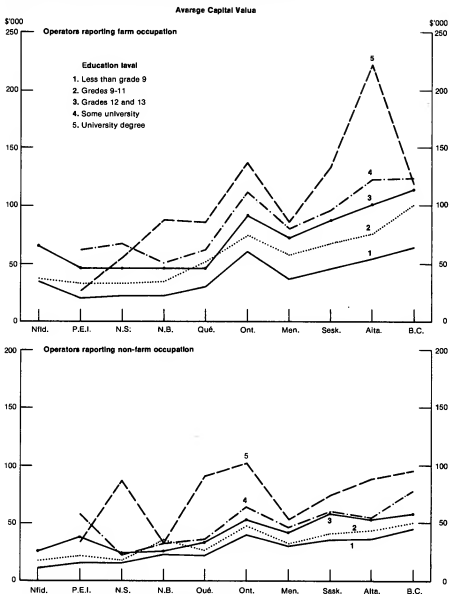


Chart 5.1 (concluded)

Average Farm Sales and Average Capital Value of Farms Classified by Farm/Non-farm Occupations During Census Week and Level of Education of Census-farm Operators, Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Why the net farm income and education relationship is somewhat ambiguous among those reporting "farming" occupations is not clear. At the very least, it seems reasonable to apply the argument advanced above to the more highly educated with "farming occupations" as well. That is, a higher level of education among these operators is also positively associated with a larger number of days of off-farm work (though the relationship is considerably less elastic). Thus, again, the motivation to underreport net farm income, or to build up capital stock, may be enhanced.

Chart 5.1, Part B conveys a clear positive relationship between education levels and value of farm capital for both occupational groups. Admittedly, among the "farming" group, capital value is more likely to be tied up in land, farm machinery and buildings than in residential or speculative real estate. While discernible positive differentials to education versus area of farms is also evident the differentials are narrow, except for the Prairies (data not shown here). This is merely another testimony that land area *per se* is, on the whole, not a criterion of major importance for distinguishing the magnitude or prosperity of a farm area.

On the basis of trends in Chart 5.1, our regression findings, and a burgeoning literature on positive returns to education, there is every reason to assume that upgrading levels of operator education would have a significant positive bearing on farm performance. In an industry where self-employed heads of farming enterprises are facing rapid technological and organizational changes, there is little novelty in the claim that higher education is conducive to improved management. However, when we consider that almost 60% of Canada's census-farm operators have less than Grade 9 education, it seems that one of the reasons for lagging farm performance among so many of Canada's farm operators may be due to failure of Canada's educational system to prepare farm operators adequately for their professions. Admittedly, however, many of those with less than Grade 9 education are older operators who were educated at a time when completion of Grade 8 education was the norm. Young operators tend to be centered in the higher education brackets to a much greater extent. This is not to say that the educational profile of Canada's census-farm operators can be expected to improve with attrition. Whether this happens will depend largely on the "drawing power" of farming as a source of livelihood for young persons entering the labour force.

As testimony that strong non-farm employment "pulls" are likely to be exerted on operators with higher levels of education, consider Table 5.6 and the indices of total operator income for operators of "farming" and "non-farming" occupations and five levels of education. First, observe the lower "elasticity" in income indices (base = 100 = income of those with less than Grade 9 education), among those with "farming" occupations. Also, observe the non-parity of incomes of "those with less than Grade 9 education" and those with university degrees. On average, the implication for Canada's census-farm operators engaged largely in farming as a means of economic livelihood, is that they face a comparative income advantage in joining the ranks of off-farm occupations.

TABLE 5.6. Differentials in Average Census-farm Operator Income by Education Level and Farm/Non-farm Occupation During Census Week, Canada and Provinces, 1971

Occupation During Census Week, Canada and Provinces, 1971

Area	Index of size of income with respect to level of education ¹						
	Those with farming occupations by education level						
	Less than Grade 9	Grades 9-11	Grades 12 and 13	Some university	University degree		
Canada							
Newfoundland	1.00	1.97	2.97	-	-	-	
Prince Edward Island	1.00	1.32	1.76	1.64	-	-	
Nova Scotia	1.00	1.26	1.58	1.21	-	-	
New Brunswick	1.00	1.16	1.52	1.63	-	1.49	
Quebec	1.00	1.20	1.28	1.31	-	1.14	
Ontario	1.00	1.29	1.33	1.42	-	1.62	
Manitoba	1.00	1.39	1.43	1.44	-	2.96	
Saskatchewan	1.00	1.14	1.24	1.25	-	1.90	
Alberta	1.00	1.26	1.54	1.68	-	2.02	
British Columbia	1.00	0.81	0.77	0.78	-	0.77	
	Index of size of income with respect to level of education ¹					Ratio of non-farm to farm income by education level	
	Those with non-farming occupations by education level						
	Less than Grade 9	Grades 9-11	Grades 12 and 13	Some university	University degree	Less than Grade 9	University degree
Canada							
Newfoundland	1.00	1.41	1.57	-	3.97	1.73	-
Prince Edward Island	1.00	1.67	2.20	1.46	4.17	1.02	-
Nova Scotia	1.00	1.19	1.50	2.10	5.16	1.14	-
New Brunswick	1.00	1.14	1.31	1.53	2.20	1.45	2.20
Quebec	1.00	1.19	1.26	1.40	2.86	1.18	2.96
Ontario	1.00	1.22	1.37	1.50	3.09	1.30	2.58
Manitoba	1.00	1.37	1.48	1.57	3.43	1.29	1.50
Saskatchewan	1.00	1.67	1.87	1.94	3.93	0.90	1.86
Alberta	1.00	1.29	1.47	1.57	3.17	1.41	2.20
British Columbia	1.00	1.09	1.17	1.21	2.06	0.84	2.25

¹ Income of the first level of education (less than Grade 9) serves as the index base = 100.

5.6. Discussion

From the preceding analysis of indices of farm performance, it is clear that areal variations cannot be interpreted meaningfully without first appreciating the bearing of marginal and part-time farmers on farm resource use.⁵ Differences in the prevalence of retirement farmers and multiple-jobholders between census divisions are likely to confound adequate understanding of areal differentials in farm performance, prosperity, wealth, etc., on many counts. For example, failure to separate full- from part-time operators results in lower average farm sales and net farm incomes, since the latter category of operators typically operate much smaller farm holdings, often report negative or zero farm income, and typically rely on their farms to a lesser extent as a source of economic livelihood.

See footnotes on page 199.

The presence of part-time operators also tends to confuse interpretation of area differentials in levels of farm output as opposed to area differentials in levels of available farm capital value, acreage, etc., because potential resources may not be put to productive use. To some extent, focus on the kinds of issue noted above has revealed that census divisions are seldom as badly off as aggregate farm sales and net farm income data often imply. Accordingly, it is a major conclusion of this study that a much more positive picture would emerge if attempts were made to adjust for (i) marginal farmers with off-farm incomes, (ii) use of farms as hobby-farms, as a tax write-off, or as a means of building up real estate holdings, and (iii) prevalence of those of retirement ages.

Of course, the situation still remains rather bleak for many census divisions even after these factors are taken into consideration. Where these census divisions are and the interventions required to stimulate either farm viability or dissolution are matters of obvious concern to planners. Although policy interventions of this nature are outside the scope of this monograph, it is within our bounds to identify those census divisions where small, seemingly unviable and inadequate farms are most prevalent.

On the whole, it seems reasonable to deem a farm "small, seemingly unviable and inadequate as a source of economic livelihood" if:

- (a) its farm sales are consistently below \$5,000;
- (b) it is managed by an operator with limited prospects for off-farm employment; and
- (c) it is managed by an operator of economically active age (implying a greater probability of dependent children and no pension income).

To identify census divisions in which the above characteristics are likely to be most prevalent, the conditions above have been measured as follows:

Condition	Measure
a	a' percentage of farms in census divisions with sales less than \$5,000
b	b' only those in category a' that have less than \$2,000 total income from all sources
c	c' a' plus b' minus percentage of operators aged 65 and over in the census division.

Combined, measures a' through c' seek to gauge the proportion of census-farm operators in census divisions that are likely to be in the poorest income category. Now, suppose 25% of the census-farm operators in census

division X operate farms with sales less than \$5,000 (criterion a'), and have total incomes less than \$2,000 (criterion b'). If 15% of the operators in the same census division are over the age of 65 years, we can be sure that there is considerable overlap between these operators and those just described in a' + b'. That is, operators over the age of 65 years are not likely to earn much at off-farm employment and are likely to operate smaller scale farms because they will be in the process of phasing out their farm operations. Of course, it would not be correct to assume that all operators aged 65 and over can be described by criteria a' + b'. Our approach is simply to remove all operators described by criterion c' from a' + b' towards producing a minimum proportion of farm operators in each census division that meet all three conditions.

Table 5.7, Columns 1 and 2, relates to measures a' and b', Column 6 relates to measure c', and Column 7 represents all three. Table 5.7, Column 8, also provides data on the magnitude of farm-related government transfer payments to each census division. Column 8 is derived as follows:

- (a) for each area, total income from government transfers (as reported by census-farm operators and not including transfer payments) has been averaged for all farms,
- (b) the average government transfer figures were divided by the average government transfer figure for Canada as a whole as a means of standardization.

Figures in Column 8 have been included merely as testimony that government transfers are positively related to poor farm performance, and must be taken into consideration in the operator's total income picture. For example, if 2.6% of Canada's operators in the low sales/low income category correspond to one unit of government transfer per farm for all Canada, then 16.2% of Newfoundland's farms in the same category should correspond to a much larger number of units of government transfer per farm in all Newfoundland. In fact, we see that almost five times as much government aid per farm unit is allocated to Newfoundland as to Canada as a whole.

In most cases, an increase in the proportion of farms in a census division in the low sales/low incomes category is accompanied by an increase in the units of aid per farm in that census division. Of course, discrepancies exist, many of which are outside our field of evaluation. At most, we are able to identify the census divisions which seem most in need of aid, those that receive a relatively large amount of aid, and those receiving a small amount. Admittedly, this kind of exercise can be, at most, suggestive, never conclusive. (See Appendix A.6 for an index map of census divisions by geographic location.)

Table 5.8 lists census divisions where the proportion of low sales/low operator incomes is highest (corresponding to condition c' and Column 7 of Table 5.7). It also indicates the number of farms in the census division, the relative level

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971

No.	Area	Gross farm sales			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
		1	2	3	4
1	Canada	8.7	5.6	6.8	6.6
2	Newfoundland.	26.2	1.5	0.5	3.5
3	Division No. 1.	23.8	0.9	—	1.8
4	" " 2.	35.7	—	—	—
5	" " 3.	44.0	4.0	—	4.0
6	" " 4.	7.7	—	—	7.7
7	" " 5.	33.3	—	—	—
8	" " 6.	37.7	—	—	—
9	" " 7.	20.0	5.0	—	—
10	" " 8.	33.3	—	—	—
11	" " 9.	—	—	—	—
12	Prince Edward Island.	14.3	5.3	6.5	4.3
13	Kings	17.9	2.9	5.8	2.9
14	Prince	14.6	5.4	5.1	4.1
15	Queens	12.4	6.2	7.7	4.8
16	Nova Scotia	16.7	3.4	2.3	3.3
17	Annapolis	16.5	1.9	1.9	5.8
18	Antigonish	10.0	1.9	1.0	0.0
19	Cape Breton	12.5	3.1	3.1	6.3
20	Colchester	16.1	5.1	2.5	4.3
21	Cumberland	19.8	5.2	2.6	3.4
22	Digby	20.4	6.8	0.0	2.3
23	Guyssborough	24.0	4.0	0.0	0.0
24	Halifax	10.6	0.0	4.3	0.0
25	Hants	13.5	1.9	2.9	3.8
26	Inverness	24.1	1.9	1.9	—
27	Kings	10.7	3.7	2.1	6.4
28	Lunenburg	25.5	1.8	—	1.8
29	Pictou	21.6	3.1	4.1	2.1
30	Queens	21.4	—	—	—
31	Richmond	21.4	7.1	—	—
32	Shelburne	11.1	—	—	—
33	Victoria	19.0	4.8	—	—
34	Yarmouth	15.4	2.6	5.1	2.6
35	New Brunswick	16.6	4.1	3.0	4.8
36	Albert	10.3	3.4	—	3.4
37	Carleton	14.4	4.8	4.2	7.8
38	Charlotte	25.0	3.1	3.1	—
39	Gloucester	22.0	2.9	—	1.5
40	Kent	25.0	3.8	2.5	—
41	Kings	16.5	3.8	4.4	3.8
42	Madawaska	10.8	5.4	2.7	8.1
43	Northumberland	15.6	2.2	—	2.2
44	Queens	21.8	5.5	3.6	3.6
45	Restigouche	17.5	2.5	2.5	—
46	St. John	33.3	—	—	—
47	Sunbury	19.2	3.8	—	—
48	Victoria	11.4	4.5	2.3	15.9
49	Westmorland	12.7	3.2	3.2	3.2
50	York	18.7	4.7	2.8	1.9

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971

Census-farm operators with total income of \$5,000 and over and farm sales of \$10,000 and over	Census-farm operators aged 65 and over	Difference between Columns 1 + 2 - 6	Ratio of average "farm" government transfers to each farm area to average for Canada as a whole	No.
5	6	7	8	
13.5	11.7	2.6	1.0	1
6.9	11.5	16.2	5.2	2
9.1	14.9	9.8	5.8	3
0.0	13.3	22.4	4.5	4
7.0	22.7	25.3	6.3	5
23.1	7.7	0.0	1.7	6
0.0	33.3	0.0	1.3	7
6.3	12.5	25.2	4.7	8
10.0	10.0	15.0	4.5	9
33.3	0.0	33.3	7.3	10
-	-	-	-	11
7.2	14.8	4.8	1.9	12
4.6	20.7	1.0	2.2	13
9.5	11.7	8.3	1.5	14
6.5	14.4	4.2	2.0	15
7.9	17.4	2.7	1.9	16
6.8	16.5	1.9	2.2	17
4.9	16.1	- 4.2	2.4	18
15.6	24.2	- 8.6	0.7	19
8.5	15.1	6.1	2.0	20
5.2	17.9	7.1	2.5	21
4.5	9.1	18.1	1.9	22
4.0	12.0	16.0	2.1	23
19.1	15.2	- 4.6	1.8	24
10.6	18.3	- 2.9	2.6	25
1.9	18.2	7.8	4.4	26
15.0	15.5	- 1.1	1.3	27
2.7	19.3	8.0	1.2	28
4.1	20.4	4.3	2.2	29
-	15.4	6.0	0.1	30
7.1	13.3	15.2	5.1	31
-	11.1	0.0	0.5	32
4.8	23.8	0.0	0.8	33
5.1	25.6	- 7.6	3.7	34
7.4	14.2	6.5	1.7	35
10.3	17.2	- 3.5	0.6	36
9.0	8.4	10.8	0.5	37
3.1	34.3	- 6.2	2.6	38
4.4	10.3	14.6	3.9	39
5.0	13.8	15.0	2.9	40
10.1	15.9	4.4	1.0	41
8.1	6.8	9.4	2.5	42
4.4	28.9	- 11.1	3.0	43
7.3	14.3	13.0	0.4	44
7.5	5.0	15.0	4.1	45
-	33.3	0.0	0.3	46
7.2	19.3	3.7	1.5	47
9.1	11.4	4.5	1.3	48
9.5	15.5	0.4	2.0	49
4.7	16.8	6.6	1.0	50

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Gross farm sales			
		Less than \$2,500	\$2,500-4,999	\$5,000-9,999	\$10,000 and over
		1	2	3	4
1	Quebec	9.1	3.8	3.8	3.1
2	Abitibi	9.7	2.0	2.0	1.2
3	Argenteuil	10.2	6.8	4.5	1.1
4	Arthabaska	3.8	1.4	3.1	5.1
5	Bagot	7.2	3.2	4.7	6.1
6	Beauce	12.1	5.8	4.5	2.6
7	Beauharnois	5.8	1.2	1.2	1.2
8	Bellechasse	10.0	4.2	4.2	4.2
9	Berthier	7.8	3.6	6.3	6.8
10	Bonaventure	21.9	3.8	1.9	-
11	Brome	10.7	3.6	7.1	2.7
12	Chambly	10.7	-	10.7	-
13	Champlain	9.3	4.5	4.5	3.8
14	Charlevoix-Est	20.0	1.8	3.6	1.8
15	Charlevoix-Ouest	20.0	6.7	1.3	1.3
16	Châteauguay	2.5	4.3	3.1	4.9
17	Chicoutimi	8.3	2.4	1.8	1.8
18	Compton	10.3	4.4	3.9	2.5
19	Deux-Montagnes	6.5	1.9	2.3	3.7
20	Dorchester	10.0	3.7	6.6	6.0
21	Drummond	7.2	3.8	4.2	3.8
22	Frontenac	9.8	5.1	4.2	1.9
23	Gaspé-Est	20.0	-	-	2.3
24	Gaspé-Ouest	16.7	3.3	-	-
25	Gatineau	12.7	6.4	3.2	-
26	Hull	11.8	5.9	5.9	-
27	Huntingdon	8.4	3.6	3.0	5.4
28	Iberville	4.8	0.8	2.4	6.4
29	Île-de-Montréal et Île-Jésus	5.3	1.1	3.2	1.1
30	Îles-de-la-Madeleine	30.0	-	-	-
31	Joliette	4.0	4.0	2.6	4.4
32	Kamouraska	12.1	7.5	4.5	1.0
33	Labelle	11.5	1.6	2.5	1.6
34	Lac-St-Jean-Est	3.6	2.9	5.1	4.4
35	Lac-St-Jean-Ouest	5.8	5.8	3.3	1.7
36	Laprairie	6.3	3.8	-	5.6
37	L'Assomption	6.4	2.9	3.5	4.0
38	Lévis	8.8	4.4	4.4	3.5
39	L'Islet	14.3	3.7	3.1	2.5
40	Lotbinière	9.0	3.6	4.7	3.0
41	Maskinongé	9.8	5.9	3.3	3.3
42	Matane	14.9	5.3	3.5	1.8
43	Matapédia	11.8	4.5	5.1	1.1
44	Mégantic	9.3	5.0	6.5	2.9
45	Missisquoi	10.6	3.3	3.9	4.4
46	Montcalm	11.1	4.2	4.9	4.9
47	Montmagny	10.3	3.7	0.7	3.7
48	Montmorency n° 1	12.2	2.0	6.1	-
49	Montmorency n° 2	3.6	1.8	1.8	1.8
50	Napierville	8.0	4.0	4.7	6.0
51	Nicolet	7.9	2.9	4.5	3.1
52	Papineau	13.4	3.4	5.6	3.4
53	Pontiac	13.9	4.4	10.1	0.6
54	Portneuf	12.5	3.9	2.7	1.6
55	Québec	11.1	1.6	1.6	-
56	Richelieu	11.9	4.8	5.6	4.8
57	Richmond	5.7	2.8	1.1	4.0
58	Rimouski	7.9	5.1	2.5	0.7
59	Rivière-du-Loup	10.3	4.5	5.5	3.1
60	Rouville	1.5	2.9	2.0	4.4
61	Saguenay	4.8	-	4.8	-
62	St-Hyacinthe	5.1	2.3	3.3	5.1
63	St-Maurice	3.9	2.9	3.9	3.9

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

Census-farm operators with total income of \$5,000 and over and farm sales of \$10,000 and over	Census-farm operators aged 65 and over	Difference between Columns 1 + 2 - 6	Ratio of average "farm" government transfers to each farm area to average for Canada as a whole	No.
5	6	7	8	
10.6	8.6	4.3	1.5	1
4.0	7.7	4.0	3.3	2
12.5	14.8	2.2	0.7	3
14.7	6.5	- 1.3	0.7	4
18.3	5.4	5.0	0.5	5
5.6	7.1	10.8	1.5	6
24.4	10.3	- 3.7	0.6	7
9.3	6.5	7.7	1.4	8
12.0	9.9	1.5	1.0	9
6.3	12.5	13.2	5.0	10
9.8	13.3	1.0	0.6	11
10.7	21.4	- 10.7	0.5	12
9.3	10.6	3.2	1.0	13
5.4	19.6	2.2	3.0	14
5.3	17.3	9.4	4.5	15
22.2	8.0	- 1.2	1.0	16
14.9	13.0	- 2.3	1.7	17
10.3	7.8	6.9	1.3	18
19.4	7.9	0.5	0.5	19
7.4	7.7	6.0	1.1	20
14.4	8.4	2.6	1.5	21
6.5	6.5	8.4	1.9	22
2.3	13.6	6.4	10.5	23
-	20.0	0.0	3.0	24
5.1	15.2	3.9	2.4	25
5.9	17.6	1.0	1.8	26
16.8	12.0	0.0	0.8	27
25.6	4.8	0.8	0.5	28
9.5	11.5	- 5.1	0.3	29
-	9.5	20.5	10.3	30
21.9	9.2	- 1.2	0.8	31
4.5	8.5	11.1	1.4	32
4.9	4.1	9.0	2.3	33
12.4	6.5	0.0	1.2	34
8.8	6.7	4.9	2.0	35
10.1	12.5	- 2.4	0.2	36
16.2	8.0	1.3	0.5	37
11.5	9.5	3.7	0.2	38
3.7	6.8	11.2	1.8	39
8.5	6.0	6.6	0.9	40
10.5	13.2	2.5	1.0	41
3.5	7.0	13.2	2.9	42
3.4	5.0	11.3	4.8	43
6.5	6.8	7.5	1.3	44
20.0	10.0	3.9	0.6	45
7.7	7.7	7.6	0.6	46
8.8	8.8	5.2	1.5	47
2.0	14.0	0.2	2.9	48
7.3	9.0	- 3.6	0.4	49
18.8	10.8	1.2	0.5	50
9.2	8.9	1.9	1.0	51
5.6	9.5	7.3	0.7	52
5.7	15.3	3.0	1.2	53
7.8	11.0	5.4	1.3	54
15.9	12.5	2.0	1.6	55
7.1	8.8	7.9	1.2	56
14.2	6.3	2.2	0.6	57
4.0	7.2	5.8	3.0	58
3.5	5.1	9.7	2.3	59
23.5	7.3	- 2.9	0.5	60
14.8	14.3	- 9.5	3.1	61
20.5	4.6	2.8	0.1	62
22.5	10.8	- 4.0	0.9	63

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Gross farm sales			
		Less than \$2,500	\$2,500 - 4,999	\$5,000 - 9,999	\$10,000 and over
		1	2	3	4
	Quebec - Concluded:				
1	Shefford	14.2	3.5	2.8	2.8
2	Sherbrooke	5.0	3.1	3.1	6.1
3	Soulanges	12.9	6.9	3.0	2.0
4	Stanstead	6.9	2.1	4.9	1.4
5	Témiscamingue	8.3	2.9	2.0	0.5
6	Témiscouata	15.0	5.3	2.3	-
7	Terrebonne	5.6	5.6	3.3	2.2
8	Vaudreuil	8.5	3.2	3.2	1.1
9	Verchères	6.1	3.8	3.1	3.1
10	Wolfe	10.3	4.8	3.6	2.4
11	Yamaska	7.0	3.7	6.1	2.4
12	Ontario	6.8	3.6	4.6	7.4
13	Algoma	14.4	3.3	1.1	2.2
14	Brant	4.8	1.4	2.7	7.5
15	Bruce	6.5	3.9	7.1	12.5
16	Cochrane	12.1	1.5	-	4.5
17	Dufferin	6.8	4.8	7.5	11.0
18	Dundas	6.8	3.8	7.6	5.9
19	Durham	9.2	3.8	3.0	5.3
20	Elgin	5.1	3.2	3.7	11.8
21	Essex	4.7	2.1	3.3	5.7
22	Frontenac	11.3	2.2	3.5	3.5
23	Glengarry	8.8	6.1	6.6	4.4
24	Grenville	9.7	6.3	6.3	3.4
25	Grey	8.0	6.0	8.2	7.4
26	Haldimand	8.3	3.8	4.7	6.5
27	Halliburton	23.5	-	-	-
28	Halton	4.0	3.5	2.2	4.4
29	Hastings	12.2	2.5	5.5	4.1
30	Huron	3.8	3.9	5.8	14.9
31	Kenora	6.9	3.4	-	6.9
32	Kent	2.5	3.2	4.7	10.8
33	Lambton	4.0	4.3	5.3	7.2
34	Lanark	12.9	7.5	6.1	5.4
35	Leeds	11.0	3.2	5.0	3.2
36	Lennox & Addington	8.9	3.8	3.8	5.5
37	Manitoulin	10.7	8.7	7.8	4.9
38	Middlesex	4.6	3.4	4.9	10.5
39	Muskoka	5.6	2.7	2.2	3.5
40	Niagara	8.6	4.3	2.2	2.2
41	Nipissing	4.5	1.4	2.0	10.7
42	Norfolk	9.5	3.6	5.6	6.4
43	Northumberland	6.9	2.3	3.9	3.7
44	Ontario	7.1	3.4	3.7	3.9
45	Ottawa-Carleton	3.0	1.9	3.6	10.1
46	Parry Sound	18.3	3.8	5.8	2.9
47	Peel	5.0	2.3	4.1	2.3
48	Perth	4.1	2.2	5.7	11.9
49	Peterborough	10.3	5.4	4.2	3.4
50	Prescott	6.3	4.3	7.5	6.3
51	Prince Edward	5.0	4.5	2.5	4.0
52	Rainy River	12.2	7.1	3.1	2.0
53	Renfrew	15.6	5.3	4.8	3.5
54	Russell	3.8	3.2	4.5	5.8
55	Simcoe	7.8	4.4	5.0	7.5
56	Stormont	10.6	5.1	6.6	9.6
57	Sudbury	10.0	2.2	1.1	5.5
58	Thunder Bay	8.3	-	1.2	3.6
59	Timiskaming	15.4	4.9	2.8	3.5

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

Census-farm operators with total income of \$5,000 and over and farm sales of \$10,000 and over	Census-farm operators aged 65 and over	Difference between Columns 1 + 2 - 6	Ratio of average "farm" government transfers to each farm area to average for Canada as a whole	No.
5	6	7	8	
8.5	11.3	6.4	0.7	1
14.2	5.7	5.4	1.3	2
6.9	10.9	8.9	0.5	3
14.6	9.7	- 0.7	2.3	4
6.9	7.8	3.4	2.2	5
3.8	4.5	15.8	3.8	6
15.6	7.8	4.5	1.5	7
16.0	13.8	- 2.1	0.5	8
14.5	9.1	0.8	0.5	9
6.7	5.4	9.7	2.6	10
11.0	9.8	0.9	0.8	11
18.6	13.7	- 3.3	0.8	12
6.7	12.1	5.6	0.9	13
30.1	13.3	- 7.1	1.0	14
19.8	12.8	- 2.4	1.1	15
4.5	13.6	0.0	0.8	16
14.4	11.3	0.3	0.5	17
11.8	14.3	- 3.7	0.5	18
13.6	15.7	- 2.7	0.7	19
30.2	12.2	- 3.9	0.4	20
21.8	13.7	- 6.9	0.6	21
9.5	19.0	- 5.5	1.0	22
14.9	14.5	0.4	0.9	23
6.9	19.4	- 3.4	2.2	24
10.0	14.8	- 0.8	1.0	25
15.6	15.1	- 3.0	0.7	26
-	23.5	0.0	1.2	27
21.1	13.2	- 5.7	0.6	28
8.1	14.8	- 0.1	1.4	29
20.6	11.7	- 4.0	0.7	30
10.3	3.4	6.9	0.9	31
28.6	14.1	- 8.4	0.4	32
15.9	15.3	- 7.0	1.2	33
7.5	18.9	1.5	0.9	34
6.0	19.1	- 4.9	0.5	35
4.2	15.7	- 3.0	0.8	36
7.8	17.5	1.9	1.3	37
24.3	15.1	- 7.1	0.5	38
20.3	15.5	- 7.2	0.8	39
14.0	9.8	3.1	1.4	40
42.9	9.6	- 3.7	0.6	41
12.0	14.5	- 1.4	0.9	42
18.7	12.7	- 3.5	0.6	43
19.1	14.5	- 4.0	1.0	44
31.0	11.1	- 6.2	0.5	45
1.9	17.1	5.0	1.8	46
29.9	14.5	- 7.2	0.7	47
24.7	11.3	- 5.3	0.4	48
10.3	14.9	0.8	0.8	49
14.6	10.7	- 0.1	0.5	50
11.9	14.4	- 4.9	1.3	51
7.1	11.2	8.1	1.3	52
6.0	16.3	4.6	1.4	53
18.6	4.5	2.5	0.9	54
14.6	12.8	- 0.6	1.2	55
11.1	16.7	- 1.0	0.6	56
6.7	11.0	1.2	1.3	57
21.4	13.1	- 4.8	1.7	58
9.1	9.0	11.3	0.8	59

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Gross farm sales			
		Less than \$2,500	\$2,500 - 4,999	\$5,000 - 9,999	\$10,000 and over
		1	2	3	4
Ontario - Concluded:					
1	Toronto	5.6	-	-	5.6
2	Victoria	9.0	4.8	5.1	3.7
3	Waterloo	3.8	1.0	3.3	7.5
4	Wellington	4.4	4.3	6.2	11.8
5	Wentworth	7.0	2.7	2.7	4.3
6	York	6.5	3.4	1.5	4.8
7	Manitoba	11.1	8.6	10.1	7.8
8	Division No. 1	10.8	5.6	8.0	6.4
9	" " 2	8.0	6.8	11.3	10.5
10	" " 3	7.0	8.2	11.7	10.5
11	" " 4	4.0	6.1	10.7	12.0
12	" " 5	18.7	6.5	5.5	2.0
13	" " 6	7.0	8.6	10.9	11.9
14	" " 7	7.3	8.1	9.7	9.2
15	" " 8	4.6	6.8	11.2	9.2
16	" " 9	7.8	8.6	10.6	6.5
17	" " 10	11.3	13.5	13.5	9.8
18	" " 11	12.7	12.3	10.1	7.6
19	" " 12	16.9	11.1	9.6	4.9
20	" " 13	7.9	6.2	13.4	10.3
21	" " 14	13.6	10.8	13.6	6.3
22	" " 15	10.7	11.1	12.4	8.1
23	" " 16	22.2	3.7	3.7	-
24	" " 17	12.1	10.5	10.0	5.7
25	" " 18	17.5	10.9	8.3	4.3
26	" " 19	26.3	7.5	3.5	2.2
27	" " 20	17.6	4.4	4.4	5.9
28	Saskatchewan	7.8	8.9	11.3	7.4
29	Division No. 1	5.6	6.9	13.0	9.8
30	" " 2	5.4	8.0	12.1	7.0
31	" " 3	5.3	8.0	11.3	10.1
32	" " 4	2.8	5.3	9.0	10.9
33	" " 5	8.7	11.2	14.1	6.2
34	" " 6	4.5	9.0	10.7	5.2
35	" " 7	4.3	7.1	13.1	10.9
36	" " 8	4.4	5.7	9.6	9.6
37	" " 9	15.0	15.2	13.0	3.5
38	" " 10	10.1	11.9	14.9	5.6
39	" " 11	5.8	7.6	11.4	7.9
40	" " 12	6.8	6.0	9.2	8.7
41	" " 13	2.4	6.0	10.3	11.6
42	" " 14	12.5	10.0	10.1	5.0
43	" " 15	9.7	8.7	9.1	6.0
44	" " 16	11.2	10.3	11.6	7.1
45	" " 17	9.4	8.3	8.3	7.8
46	" " 18	12.0	14.0	16.0	6.0
47	Alberta	8.6	6.0	8.0	9.1
48	Division No. 1	1.8	2.3	6.2	12.1
49	" " 2	2.5	2.4	6.8	14.4
50	" " 3	3.3	1.9	4.0	13.9
51	" " 4	2.8	3.7	6.9	9.1
52	" " 5	2.2	2.8	5.8	13.6
53	" " 6	3.8	3.1	5.2	11.1

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Continued

Census-farm operators with total income of \$5,000 and over and farm sales of \$10,000 and over	Census-farm operators aged 65 and over	Difference between Columns 1 + 2 - 6	Ratio of average "farm" government transfers to each farm area to average for Canada as a whole	No.
5	6	7	8	No.
22.2	15.8	- 10.2	0.0	1
8.5	17.7	- 3.9	1.3	2
32.3	10.3	- 5.5	0.7	3
17.7	11.5	- 2.8	0.3	4
21.4	13.9	- 4.2	0.9	5
19.4	11.1	- 1.2	0.4	6
9.4	11.1	8.6	0.8	7
14.2	8.8	7.6	0.9	8
11.5	8.9	5.9	0.7	9
12.8	10.1	5.0	0.4	10
13.9	10.4	- 0.3	0.5	11
4.5	12.9	12.3	1.3	12
13.5	11.9	3.7	1.0	13
13.2	12.2	3.2	0.5	14
15.3	10.6	0.8	0.6	15
12.6	12.6	3.8	0.9	16
5.5	14.7	9.9	0.9	17
6.6	9.8	15.2	0.7	18
5.3	10.3	17.1	1.5	19
12.8	10.6	3.5	0.7	20
4.5	10.8	17.6	0.9	21
4.7	12.0	9.8	0.7	22
14.8	11.1	14.8	1.2	23
6.9	12.6	10.0	0.5	24
4.6	9.5	18.9	1.0	25
4.4	12.2	21.6	1.1	26
14.7	17.3	4.7	0.4	27
11.5	11.8	4.9	0.7	28
14.0	11.6	0.9	0.7	29
9.9	13.6	- 0.2	0.4	30
11.0	11.6	1.7	0.5	31
21.8	12.7	- 4.6	0.5	32
6.3	12.3	7.6	0.4	33
11.7	11.5	2.5	0.7	34
13.4	11.8	- 0.4	0.7	35
18.7	11.9	- 1.8	0.5	36
3.9	10.5	19.7	1.0	37
6.4	10.8	11.2	0.5	38
13.5	11.5	1.9	0.6	39
17.9	12.2	0.6	0.5	40
18.6	9.4	- 1.0	1.0	41
9.0	12.4	10.1	0.9	42
10.4	11.5	6.9	1.0	43
8.1	12.0	9.5	1.0	44
14.2	13.2	4.5	0.9	45
2.0	15.7	10.3	0.8	46
14.6	11.0	3.6	0.8	47
21.6	5.6	- 1.5	0.8	48
25.7	10.4	- 5.5	0.5	49
24.6	14.5	- 9.3	0.7	50
27.7	10.8	- 4.3	0.3	51
28.0	9.9	- 4.9	0.4	52
21.7	12.6	- 5.7	0.6	53

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Concluded

No.	Area	Gross farm sales			
		Less than \$2,500	\$2,500 - 4,999	\$5,000 - 9,999	\$10,000 and over
		1	2	3	4
Alberta - Concluded:					
1	Division No. 7	5.5	7.5	10.1	12.6
2	" " 8	7.6	5.5	8.6	11.0
3	" " 9	11.1	-	-	-
4	" " 10	9.4	8.5	11.2	9.6
5	" " 11	8.7	5.1	5.9	6.1
6	" " 12	17.6	7.8	10.1	5.2
7	" " 13	12.8	9.7	9.3	6.0
8	" " 14	14.7	4.7	4.2	4.2
9	" " 15	14.3	7.7	8.5	5.4
10	British Columbia	10.2	2.8	2.6	3.3
11	Alberni - Clayoquot	5.3	5.3	5.3	-
12	Bulkley - Nechako	6.6	4.7	3.3	4.0
13	Capital	11.2	2.4	2.4	2.4
14	Cariboo	11.3	3.3	4.0	6.0
15	Central Fraser Valley	8.6	1.7	1.1	4.0
16	Central Kootenay	13.2	4.2	2.1	1.4
17	Central Okanagan	7.0	2.3	5.6	4.2
18	Columbia - Shuswap	16.7	1.8	0.9	2.6
19	Comox - Strathcona	11.3	4.8	1.6	3.2
20	Cowichan Valley	13.6	2.5	-	2.5
21	Dewdney - Alouette	7.5	1.9	0.6	3.1
22	East Kootenay	9.0	3.0	6.0	3.0
23	Fraser - Cheam	8.0	0.8	0.8	2.8
24	Fraser - Fort George	10.2	2.3	1.1	1.1
25	Greater Vancouver	8.7	1.1	1.1	1.4
26	Kitimat - Stikine	7.1	7.1	-	-
27	Kootenay Boundary	3.2	4.9	1.6	9.8
28	Mount Waddington	-	-	-	-
29	Nanaimo	15.1	5.7	-	-
30	North Okanagan	12.1	3.4	3.9	1.9
31	Ocean Falls	33.3	-	-	-
32	Okanagan - Similkameen	9.3	3.4	3.4	3.7
33	Peace River - Liard	16.5	6.2	6.8	4.4
34	Powell River	-	-	-	-
35	Skeena A	33.3	-	-	-
36	Squamish - Lillooet	7.1	-	7.1	7.1
37	Sunshine Coast	20.0	-	-	-
38	Thompson - Nicola	7.9	2.1	3.6	2.8

of government transfers and the average capital value of farms for operators with total incomes of less than \$2,000. The most interesting question raised by the data in Table 5.9 is whether those census divisions with relatively low government transfers are significantly different from those with relatively high government transfers. To this end, each census division has been examined further to see if additional characteristics of census divisions as a whole and farms with total operator incomes less than \$2,000 are also suggestive of low economic levels of living. For example, levels of income, proportion of income from farming, average total sales, days of off-farm work, farm capital value, years of operator education

TABLE 5.7. Percentage Share of Operators in Specified Areas by Select Total Income, Farm Sales and Age Characteristics, Canada, Provinces and Census Divisions, 1971 - Concluded

Census-farm operators with total income of \$5,000 and over and farm sales of \$10,000 and over	Census-farm operators aged 65 and over	Difference between Columns 1 + 2 - 6	Ratio of average "farm" government transfers to each farm area to average for Canada as a whole	No.
5	6	7	8	No.
18.7	11.7	1.3	0.3	1
13.8	13.0	0.1	0.9	2
33.3	10.0	1.1	4.0	3
10.8	10.8	7.1	0.5	4
12.4	11.7	2.1	0.9	5
5.2	7.7	17.7	1.4	6
7.2	10.5	12.0	0.9	7
2.6	14.7	4.7	1.2	8
6.4	10.8	11.2	1.3	9
15.0	12.1	0.9	1.7	10
10.5	5.3	5.3	1.3	11
9.3	5.3	6.0	1.4	12
11.2	16.7	- 3.1	1.4	13
8.6	7.9	6.7	1.2	14
25.6	10.1	0.2	1.6	15
8.3	17.4	0.0	1.2	16
14.4	13.0	- 3.7	1.5	17
9.6	13.3	5.1	1.4	18
4.8	14.5	1.6	3.0	19
13.6	14.8	1.3	2.5	20
20.8	13.9	- 4.5	2.0	21
16.4	16.4	- 4.4	0.8	22
27.9	10.0	- 1.2	2.5	23
5.7	5.6	6.9	1.0	24
23.0	14.6	- 4.8	1.1	25
21.4	14.3	- 0.1	0.9	26
8.2	9.7	- 1.6	1.8	27
-	-	-	-	28
9.4	17.0	3.8	2.6	29
9.2	14.0	1.5	2.2	30
-	25.0	- 8.3	4.6	31
9.6	14.9	- 2.2	2.4	32
7.6	9.1	13.6	1.4	33
-	-	-	-	34
-	33.3	0.0	0.6	35
7.1	-	7.1	0.3	36
-	-	20.0	0.0	37
16.4	13.6	- 3.6	1.7	38

and proportion with government transfers as a major source of income, were also scrutinized. The only significant differential we could find has to do with average capital value of farms where operator income was less than \$2,000. Among many of the census divisions with relatively low government transfers, farm capital value was relatively high, indicating greater accumulated wealth. To an extent, this alone implies that farms in these census divisions are not as greatly in need of government transfer aid as their counterparts. As noted previously, however, the kind of analysis provided here hardly results in conclusive insights; it is merely suggestive of farm areas where some farms needing aid seem to get it, while others seeming to need just as much aid appear to be receiving less.

**TABLE 5.8. Select Characteristics of Census Divisions with
Relatively Large Proportions of Their Operators Aged 15-64 and
with Low Farm Sales and Low Total Incomes, 1971**

Province and census division	Number of farms	Relative level of government transfers	Average capital value of farms with less than \$2,000 total income
	1	2	3
			dollars
Newfoundland:			
Division No. 1	549	High	27,100
" " 2	59	High	16,600
" " 4	148	High	21,900
" " 7	87	High	12,700
" " 8	108	High	12,400
" " 9	8	High	7,700
Nova Scotia:			
Digby	216	Low	16,500
Guysborough	116	Low	11,000
Inverness	299	High	23,500
Richmond	63	High	17,000
New Brunswick:			
Carleton	810	Low	28,100
Kent	401	Low	19,400
Queens	279	Low	26,500
Quebec:			
Beauce	2,301	Low	20,600
Kamouraska	1,005	Low	23,700
L'Islet	810	Low	19,600
Ontario:			
Timiskaming	712	Low	99,000
Manitoba:			
Division No. 5	2,420	Low	81,000
" " 11	1,576	Low	41,800
" " 12	2,646	Low	66,300
" " 14	859	Low	47,800
" " 16	147	Low	41,700
" " 18	1,741	Low	31,000
" " 19	1,132	Low	94,000
Saskatchewan:			
Division No. 10	4,668	Low	54,600
" " 14	6,030	Low	50,900
Alberta:			
Division No. 12	3,530	Low	46,900
" " 13	5,978	Low	50,600
British Columbia:			
Peace River - Liard	1,745	Low	...
Ocean Falls	19	High	43,500

... Figures not appropriate or not applicable.

FOOTNOTES

¹ See footnote 1, Table 3.7 for a list of variables considered.

² Data provided by Canada Department of Agriculture. See also footnote 5, Chapter 1.

³ Values of elasticity are used only as a crude means of gauging relative quantitative impact of change in an independent variable on the dependent variable.

⁴ Although the \$5,000 sales mark is a crude, arbitrary indicator of farm scale, it is most commonly used by planners as indicative of small-scale farming. That is, after expenditures, resulting net farm income alone is not likely to be enough to place a farm operator (let alone him and his dependents) above Canada's rural "low-level income cut-off" line (see Chapter 3).

⁵ For our purposes, the terms "marginal" and "part-time" can be used relatively loosely; the difference between them is that the former usually implies small scale or a stake in farming that is relatively small (i.e., retirement or hobby farming), whereas the latter is usually a multiple-jobholder, with sources of income other than farming, who is likely to operate smaller-scale farms than his full-time farming counterpart.

CHAPTER 6

SUMMARY AND CONCLUSIONS

6.1. Introduction

There can be little argument that the **human factor** in Canadian agriculture has long been neglected. Unfortunately, this neglect has gone hand in hand with inadequate data. As a result, embarrassing information gaps and critical vacuums have characterized knowledge about the socio-economic status opportunities and performance of Canada's farm population.

For some time, Statistics Canada has been under pressure to devise projects aimed at filling these data gaps. One problem is that Canada's largest data source – the Census of Population – has provided only the most basic data on demographic characteristics of Canada's census-farm population. Furthermore, components such as farm operators and farm operator dependents have not been readily identified or characterized in socio-economic terms. In no case have the socio-economic characteristics of various farm population subgroups been related to the characteristics of their respective farm operations. As for the Census of Agriculture, it has been an enterprise-oriented enumeration providing limited data only on the characteristics of Canada's census-farm operators.

This study analyzes results of a Statistics Canada project designed to improve on the paucity of data. The project is called the 1971 Ag-Pop Linkage and the improved data base has been made possible via computerized linkage of the independently enumerated 1971 Census of Population and 1971 Census of Agriculture. The project permits cross-classification of variables on the two questionnaires brought together for Canada's 366,000 census-farm households (i.e., a 100% linkage project).

The resulting data base and prospects for evaluating research questions are quite enormous. Our approach has been guided by three broad objectives:

- (a) to place the reader in touch with general demographic, geographic and socio-economic characteristics of Canada's 1971 farm population by drawing selectively on the wide range of variables in the 1971 Ag-Pop data base – many more than could possibly be described, let alone analyzed effectively in one census monograph;
- (b) to define and measure farm income with this unique set of data; and
- (c) to provide a tentative framework for synthesizing effects of human factor endowments, opportunities for off-farm work, farms enterprise characteristics and regional differentials on farm operator and farm family incomes.

Analysis of income returns to farm and non-farm activity has been by far the major analytical concern of this inquiry. Given the obvious importance of incomes to the economic well-being of Canada's census-farm population, considerable emphasis has been placed on levels, sources and determinants of census-farm operator and census-farm family cash incomes. As for our third objective, treatment of this subject has been, understandably, restricted. For example, our data base covers only the input side of the farm-productivity equation (data on prices, and other demand features are not included in the Ag-Pop base). Being a census monograph, this implies that evaluation of farm productivity in terms of quantified demand relationships has been largely out of the question. Further, our evaluation of differential incomes has, at times, been restricted as our measurement of "influences of income" levels has sought greater theoretical and analytical rigour than has been possible with the existing Ag-Pop data set.

Of course, a study based on Statistics Canada census data also has a number of limitations which should be borne in mind when gauging adequacy of analytical approach and significance of findings. The most important of these are:

1. Given census confidentiality rules, analysis is limited to average values, distributions, etc., for population aggregates rather than individuals. (It is forbidden to disclose census data which allows identification of any individual person.) For example, correlations or regressions using individual values as units of analysis have not been possible, whereas use of average values for 252 census divisions (as units of analysis) has. This limitation imposes problems of ecological correlation, lack of precision in calculating elasticities between variables, and inability to identify and remove "epiphenomenal" observations.

2. The census snapshot principle (see Chapter 2) tends to be undermined if census week is not a typical week during census year or if census year is not a typical year during the census decade. Such a problem exists in our analysis of incomes. That is, in 1970 (which is the census referent year for incomes) wheat producers experienced a particularly poor year (i.e., there were voluntary and government-induced production cut-backs in view of wheat surpluses).

3. There is no way of ascertaining the truthfulness of replies to questions that respondents typically consider an invasion of privacy. Income questions are a case in point. This means that the accuracy of absolute census income figures and inferences about exact levels of income will always be open to some question. It also means that discussion of census measure personal income will do better to focus on structure of incomes (source, distribution, etc.) than absolute levels.

4. This study is just a beginning. Interest in the socio-economic characteristics of Canada's farm population is much too broad and information has been much too limited to justify evaluation of one particular model or a few hypotheses. For these reasons, this study has aimed more at profiling general structural attributes of Canada's census-farm population and broad "conditioners" or correlates of farm performance than rigorously calibrated elasticities of farm input-output relationships.

5. Analysis of some research questions has been purposefully limited in the interests of avoiding overlap with other planned census monographs (e.g., a planned monograph on off-farm work of operators).

With the above in mind, the major findings of our inquiry are listed below. Caution is advised in interpreting the importance of some of the reported figures, since limitations and disclaimers to do with their credibility, significance, etc., can only be appreciated by a thorough reading of the text.

6.2. Summary of Major Findings

1. Canada's "farm population" can be divided into three components: "population residing in farm operator households located on census-farms", "population residing in farm operator households located at places other than on census-farms", and "population residing in other households located on farms but which do not contain a farm operator member". Of Canada's 1,673,000 farm population, approximately 85% are of the first component, 10% the second and 5% the third. This study focuses largely on the first component and terms it Canada's **census-farm population**. Our use of this term differs from that of the 1971 Census of Agriculture (as reflected in its published bulletins) since we refer to the first component above, not the first plus the third component.

2. Although the majority of Canada's farm population resides in operator households located on farms (census-farm population or resident farm population), this proportion varies considerably between provinces. In the Prairie province of Saskatchewan, for example, 77.6% of the farm population falls in this category while 21.7% reside in farm operator households located off farms. These variations are due in large measure to provincial differentials in type of farming. In Saskatchewan, wheat farming is predominant and requires less full-time surveillance than, say, livestock farming (which is more prevalent in Ontario, for example).

3. Not only are younger males and females more migratory from census-farm areas than those in the older age categories but females are more migratory than males. Both trends can be linked to less favourable labour force and income opportunities in rural farm than non-farm areas. Admittedly, female activity rates have risen considerably in Canada's farm sector over the last few decades (see footnote 2, Chapter 2). However, this seems attributable more to increased involvement in unpaid or marginally paid family labour than to full-time paid work. Even when wives play a larger role in operation of census-farms, there are indications that they are taking the place of hired labour (required less on a full-time basis), or are freeing their husbands for off-farm work. To illustrate the latter point, the average income of approximately 4,500 wives classified as "operator of the census-farm" is only 20% of the average income of their working husbands and only 25% of the average income of male household heads "classified as operators of census-farms".

4. The age distribution indicates upturns of migration in older ages. This trend is well-known to migration theory, has been experienced by almost all industrial societies, and has been coined retirement migration (see Shaw: 1975).

5. Of Canada's 366,000 census-farm operators residing on farms, approximately 93% are members of families and approximately 96% of these are headed by males. A classification of these family heads reveals their considerably older age profile in contrast to all family heads (i.e., of all Canada). That larger proportion of younger family heads is found in Ontario, British Columbia and Alberta is attributable largely to the greater economic prosperity of these areas (implying less out-migration).

6. Family size of census-farm populations are generally larger than those of all Canadian families. The same holds for proportions of census-farm families with six or more family members. Explanation of the latter differential is relatively straightforward; it derives from the socio-economic theory of fertility, with its emphasis on lower costs of providing for children in farm versus urban areas, benefits to be had from children engaging in family production in self-employment farm settings, etc. (For explanation of the theory and evidence, see Shaw, 1974.) At the same time, however, larger proportions of old or "empty-nest" families in census-farm areas tend to depress average family size to the point that differences between farm and non-farm families are only about one (i.e., 4.5 versus 3.5 - 4.0, respectively).

7. While the absolute number of emigrants from Canada's farm sector has declined substantially, the rate of out-migration has actually increased (see footnote 5 to Chapter 1). These rates are highest in Quebec and the Maritime provinces. (An analysis of the decline in farm numbers is presented in Chapter 5 and is summarized later.)

Of course, not all farm migration is off-farm. Between 1961 - 71, 127,000 aged five and over (9.7% of all census-farm population aged five and over) migrated to or within Canada's farm sector. Over-all, Ontario and British Columbia are the major recipients of interprovincial farm migrants. Migration from a different province is the major external influence on additions to or shifts of geographic location of farm population. As for incidence of movement, approximately 60% of all persons moving, move only once, 20% twice and 20% three or more times. These ratios are relatively constant across provinces. The age profiles of the movers are, as would be expected, weighted more to those in the younger ages.

8. Unlike the 1944 - 60 period, immigrants to Canada's farm sector play a very small role (only 0.7% of Canada's 1971 total census-farm operators). Actually, over the last few decades there has been a smaller and decreasing share of immigrants locating in the census-farm than non-farm areas. This is understandable in view of the fact that characteristics of labour force age immigrants to Canada are required to be compatible with and desirable for Canada's occupational-industrial structure and needs (see Shaw, 1973). As there already exists an exodus from farm areas, immigrants professing interest in farming would be less likely to receive immigrant visas.

9. Census-farm family heads are endowed with considerably lower levels of education than their non-farm counterparts. About 1.5 the proportion of Canada's census-farm family heads have less than Grade 9 education. Ratios of census-farm to all family heads with Grades 5-8, 9-11, 12 and 13, or with university degrees are approximately 1.6, 0.9, 0.5, and 0.2, respectively. The lower education profile is attributable to the exodus of younger more educated farm males and females and, possibly, to lower opportunity cost to higher education in farming. Levels of education are lowest in the Maritime provinces and Quebec, where we also find a disproportionate share of census-farm family heads in the older age categories. Where farm operators have taken vocational courses to upgrade their educational attainment, the largest proportion have taken non-agricultural vocational courses.

10. As education is important to the factor mobility of census-farm operators wishing to leave farming, inertia may be due to the fact that poorly educated farm operators wishing to migrate are actually at their place of best competitive advantage, given the skills and educational credentials they have to offer to market place.

11. Of approximately 949,000 census-farm persons aged 15 and over, approximately 672,000 or 71% worked in 1970, and 68% or 646,000 were classified as being in the labour force during census week. These rates are generally higher than in non-farm areas (68% versus 63%) as farming is a self-employment industry which typically absorbs a large number of unpaid family workers, retains persons exceeding retirement ages (say, 65 years and over), and is likely to be characterized more by underemployment than unemployment.

Of the 68% or 646,000 persons classified as being in the labour force during census week, approximately 50% are farm operators (322,000 residing on farms), and 50% are other persons aged 15 and over residing on census-farms in census-farm operator households. Of the 50% other census-farm persons, a little over half are in the agricultural labour force (mostly as unpaid family labour); of the balance in the non-agricultural labour force, most are wage and salary earners. We also observed that for provincial distributions of census-farm labour force persons aged 15 and over in the agricultural versus non-agricultural labour force, the agricultural share is larger in the more prosperous farm area.

12. Considering all census-farm operators (residents and non-residents), approximately 35% report "other than a farm occupation during census week". This proportion is as high as 65% in Newfoundland and as low as 21% in Saskatchewan. While 35% reported other than a farm occupation, approximately 38% of all farm operators reported wages and salaries, and 46% reported off-farm employment income as their major source of income. This serves as a clear indication that classification of populations according to presence of a "census-farm operator" runs the risk of creating false impressions about the share of Canada's population that is really tied to the land.

13. A considerably smaller proportion of females in the census-farm population are income earners (28%) than among their non-farm counterparts

(41%). This applies for all provinces. This may be at the basis of the underrepresentation of younger females in the age distribution if females emigrate to non-farm areas in expectation of improved economic opportunities.

14. For census-farm males aged 15 and over who earn income (approximately 86% of all males 15 and over), only about 56% (50% of all males aged 15 and over) earn farm income, while only about 39% (34% of all males aged 15 and over) earn 50% or more of their total income from farming. Again, there is the strong impression that net self-employment farm income plays a small role in the income equation of a large share of Canada's census-farm population. It certainly raises questions about the extent to which farmers roll profits back into their capital stock and whether income in kind weighs heavily in the economic livelihood of farm families.

15. As important as evaluation of farm operator and family income is to this inquiry, cash income represents only a partial measure of income and levels of living in farm areas. For examples, cash income does not take into consideration income in kind, differentials in accumulated or inherited wealth, amenities or facilities associated with place of residence, or relative deprivation associated with perception of income inequality. These considerations not only reduce legitimacy of within sector income comparisons but confound farm/non-farm income comparisons.

Intersectoral income comparisons are doubly difficult to make, given that 1970 was not a particularly good crop year. As wheat is, by far, Canada's most important farm product, this reflects on all income estimates at the Canada level, and on income estimates for Alberta, Manitoba and Saskatchewan at the provincial level (i.e., 97% wheat produced by the Prairie provinces).

Acknowledging crudity of farm/non-farm income comparisons, we compared total population, urban population and census-farm per capita incomes, and adjusted the latter for income in kind. We found per capita incomes of Canada's census-farm population to be about 0.54 that of Canada's total population. This fraction increases to 0.69 when a crude adjustment is made for income in kind. In all comparisons by province, we found that income levels were higher in Ontario, Alberta and British Columbia.

16. Median census-farm family incomes are about 10%-20% less than average farm family incomes. This gap is somewhat larger than is observed for urban families, indicating greater inequality of incomes in the former case. At the same time, we observe that ratios of median to average income of census-farm persons are more even between provinces than ratios of the same for the urban sector of each province. When we compare census-farm family income with averages for all Canadian families, the previously noted ratio of 0.54 for the two groups of persons aged 15 and over increases to 0.72 (for families); with the addition of income in kind the ratio increases to 0.9. In the provinces of Newfoundland, Prince Edward Island, Nova Scotia, Ontario and British Columbia,

census-farm families appear to fare fairly well in comparison with their non-farm counterparts. In almost all cases, census-farm families have higher average income than do rural non-farm families.

17. Although Canada has no official poverty lines, Statistics Canada has developed low-level income cut-off lines (revised for our purposes) which have been used to establish that approximately 36% of census-farm families versus 15% of urban families were below the cut-off point. The revised 1970 low-level income cut-off lines (based on expenditure data from the 1961 Family Expenditure Survey) are (i) approximately \$4,650 for an "average" urban family of 3.0 - 3.5 persons (in 1970), (ii) approximately \$4,150 for an "average" rural farm family of 4.0 - 4.5. At first impression, the rural farm family size of 4.0 - 4.5 may seem small (actually 3.9); recalling migration patterns, and the prevalence of older family heads, however, underscores the fact that a large proportion of rural farm families are "empty-nest" families.

18. Crude attempts to evaluate dimensions of adequacy of income for census-farm families indicate that for Canada's census-farm sector, the **Gini coefficient** was on average 1.5 times that for Canada's urban sector, whereas ratios of "percentage of Canada's census-farm population with per capita incomes less than the low-level income cut-offs" to the same for Canada's urban population was about twice and was highest for Quebec, Manitoba and Alberta. However, a refined measure of per capita income tends to reduce the gap between farm and non-farm areas considerably.

19. Age and total income are positively related, though more so for males than females. A positive relationship is expected, since older age implies the accumulation of experience and capital stock conducive to higher output in self-employed activity and seniority in wage and salary jobs. Lack of a relationship for females can be attributed to their greater involvement in unpaid family work, taking part-time jobs, interrupting their labour force careers (and therefore seniority), and being discriminated against.

20. Incomes of census-farm persons employed in non-farm industries (i.e., according to occupation reported during census week) are, on average, 1.5 times those employed in the farming industry. All indications are that, if non-agricultural employment opportunities were available, and if farm family persons met skill requirements, then, on average, pecuniary returns to leaving the farm sector are strongly positive in all provinces.

21. While there is a definite positive income-education relationship among census-farm males, the relationship is not highly elastic nor does it exist to the same extent for females. In all provinces, the income-education relationship could be described as relatively flat up to the point of "university degree", at which point levels bound upwards. For example, in comparison with other levels of education, the proportion of male farm persons earning total income in excess of \$10,000 jumps threefold for those with university degree while the corresponding jump for females is about sevenfold. Further scrutiny reveals that when the income source is non-agricultural, the income-education relationship is much more positively elastic than when the income source is agricultural.

22. Unhappily, it appears that with increasing reliance on farming as a source of cash income, returns to higher education are less direct. For those deriving 75% - 100% of their total income from farming, the income-education relationship is positive but only gradually. For those in the 0% - 24% category, the relationship is strongly positive and highly elastic.

23. Dwelling facilities such as "flush toilet", "hot water outlets", etc., are positively correlated with income levels. Dwelling characteristics such as number of rooms, etc., are less related to income, probably because of measurement problems. That is, census-farm dwellings are usually very old, large structures which are often "passed down", and because of age are seldom amenable to qualitative or quantitative evaluation using current building standards (i.e., in the same way that urban dwellings are, which have been built to conform to relatively well standardized building criteria).

24. That off-farm employment has become increasingly important as a source of income to Canadian census-farm families over the last few decades is, clearly, one of the most important structural features of Canadian agriculture. The 1941 Census of Agriculture reported that off-farm employment contributed about 13.7% to total farm family income whereas total off-farm income contributed approximately 17%. A 1958 Farm Survey reported the off-farm employment share at 25% and the total off-farm share at 37%. The 1971 Ag-Pop Linkage found that approximately 60% of total census-farm family income was attributable to off-farm employment while 73% was attributable to all off-farm sources. Problems of comparing 1941, 1958 and 1971 results arise from changing definitions of "census-farms" and on size of the "sample universe". An interesting comparison is found in the United States 1969 Census of Agriculture, which found 57% of total farm family income originated from off-farm employment.

25. The shrinking contribution of net self-employment farm cash income (hereafter farm income) as part of total farm family cash income is evident for census-farm operator families where approximately \$4,100 and \$900 of \$6,900 total family income originate from off-farm employment and non-employment sources, respectively. In British Columbia, the Maritimes and Ontario, farm families are least dependent on farming as a source of income. Also, in no province does the contribution of farm income to total family income exceed income from off-farm sources. The farm contribution to total farm family income is as low as 11.6% in Newfoundland and 12.5% in British Columbia. In other terms, off-farm employment income is at least two to three times more (on average) than self-employment farm income; in most provinces, off-farm non-employment income exceeds half that of reported farm income.

26. With respect to all census-farm persons aged 15 and over who reported income, about equal shares report wages and salaries (41.2%) and farming (43.9%) as their major source of income. As a residual, self-employment non-farm income, government transfers and pensions, *et al.*, account for only 15%.

27. Among census-farm family heads that report wages and salaries (41.2%), non-farm self-employment (5.0%), government transfers (6.4%) and pensions, *et al.* (3.5%) as their major source of income, only a very small proportion of their

total income derives from farming (i.e., approximately 5% - 10% - reported as the operator family member's share from farming). In contrast, of the 43.9% of census-farm family heads reporting farm self-employment as their major source of income, approximately 66% of their total farm family income derives from farming *per se*.

28. Among operators reporting farm net self-employment as their major source of income, we also observe considerably lower levels of income than for those with major sources of income other than farming. That is, those farm families reporting wages and salaries as their major source, show total income of about \$9,000 (\$5,800 contributed by the operator from all sources with \$4,000 of that originating from farming), versus \$5,300 for those reporting farm self-employment as a major source (\$4,200 contributed by the farm operator from all sources, with \$3,500 originating from farming).

29. Regardless of major source of income, census-farm operators seem to contribute about the same percentage share (from all their sources) to total family income. That is, the farm operator's percentage contribution to total farm family income is consistently, or nearly always the same. The operator's contribution always represents a large majority and dominates the contribution of all other census-farm family members combined.

Also, co-variations between levels of farm family and farm operator income are always similar among provinces, regardless of source of income. This means that location of a farm family, farm operators, or farm in a particular province has a considerable influence on the level of earned income. This is the case whether the source of employment income is wages and salaries, farm self-employment or non-farm self-employment. In other words, regional economies (or geographic location) operate as an important influence on differential levels of attainable income. In further disaggregations of income by farm characteristics, we observe this to be the case even when controlling for farm characteristics. Thus, two farm families with the same profile of human and non-human factor endowments are likely to earn different rates of return when located in different provinces.

30. With respect to conditioners of differential farm family income levels, a shorter period of residence on a farm during any given year usually implies less dependence on farming as a source of livelihood, and higher family income. The explanation is (i) almost twice the proportion of non-resident farm operators report non-farm occupations as do resident farmers, and (ii) on average, those with non-farm occupations generally earn higher incomes.

31. Income from all sources rises with family size but the farm operator's percentage contribution remains relatively constant across all family size categories. In effect, this means that an addition in family size from two to, say, six persons does not result in a substantial relative increase in family member contributions. Why then would the absolute level of operator income rise with larger family size? One reason may be that a larger number of dependents could motivate the operator to earn more. More likely, however, larger family size

provides a reserve of unpaid family labour which helps reduce farm expenditures, increases the operator's cash income from farming, and frees him for more off-farm work.

32. As noted previously, total family income and education of family heads are positively related. In profiling education of family head and total family income from farming, by province, we observe a decline in farm income that approaches zero and becomes negative with university degree attainment. In light of the high total over-all farm family and farm operator income earned by those with "university degree", and in light of the high over-all capital value and value of expenditures on their farms, it seems reasonable to argue that farms are being used as a tax write-off or that capital stock is being built up (i.e., both of which reduce reported net farm income).

33. While economic class of farm, and both total farm family income and family income from farming are positively related (as expected), interesting discrepancies emerge. For example, in the lowest economic class (sales less than \$2,500), total farm family and farm operator incomes are higher than for those in the \$3,750 - \$7,500 sales categories. This might be explained by the fact that, among farm operators with the lowest farm sales, off-farm employment and accompanying non-farm employment incomes are higher than among farmers in the sales category \$3,750 - \$7,500, where there is a slightly higher reliance on farming and consequently lower total incomes. In other terms, farm operators with farm sales in the low, but not the lowest, economic class may be worse off than the latter group as they seem to be more reliant on their inadequately sized farms as a major source of income.

34. We also observe a levelling-off of operator income from farming for the largest sales categories, in contrast to rising total farm family income. Total farm family income rises because off-farm work of farm operators plays an increasingly important role, even among operators of relatively large-scale farms. With respect to farm magnitude, and speaking in terms of averages only, we hypothesize that there may be a cut-off point to positive marginal returns to farming.

35. Generally, the absolute contribution of "operator non-employment off-farm income" to farm family total income remains relatively flat, regardless of the family or farm characteristics used to disaggregate incomes. The only difference is that government transfers are more important to incomes of marginal operators (lower sales categories) whereas investment income is more important to families with farms in higher sales categories. As absolute levels of this source of income are also relatively flat across provinces, a decision was made to exclude it from further analysis, since it has been observed to behave the same no matter what characteristic is used to disaggregate incomes.

36. Just as gross farm sales and average farm capital value are positively and highly correlated, we expect a similar relationship between capital value and farm family incomes. Such is the case, but with a few important variations. First, absolute net self-employment farm income does not level off with higher capital value class as it did with higher economic class of farm. Even though total capital value includes value of residential buildings, the fact remains that farm capital

value pertains largely to farm inputs. Thus, larger farm holdings should be indicative of a stronger profit capital value relationship than was observed for economic class of farm. Of continual surprise, however, is the larger relative share of total farm family and farm operator income derived from off-farm sources in the highest capital value classes.

37. As size of farm is also strongly and positively correlated with gross farm sales and capital value, we expect a repeat of the trends summarized above. While this is generally the case, we also observe (i) a dip in total farm family and farm operator income between farms sized 10-69 acres and 1,600 acres plus, and (ii) about equal levels of total income attained for families with the smallest versus largest farms. As we know that farm operators with the smallest farms (say, one to nine acres) are largely involved in non-farm occupations, our data imply that operators involved predominantly in farm occupations require (on average) farms about 1,600 acres or more to attain cash incomes equal to those employed largely in non-farm occupations. On average, however, even families managing farms of 1,600 acres or more derive a considerable share of their total family income from off-farm employment.

38. Rental of land, whether to increase insufficient incomes from farming or as a means of raising adequate incomes further, is expected to expand the scale of holdings toward that effect. We observed this to be the case. Yet, total farm family and total farm operator income are nearly the same for each tenure class. A reason for high farm income among part-owner/part-tenant farm operator families may derive from the fact that they own less fixed capital and put more labour, proportionately, into their farms than do owners (only 17.1% report off-farm work versus 55.0% for owners). In other words, fixed capital costs to farm operations will be lower (though there will be land rental costs), while farm operator labour invested in farming would be higher.

39. Differentials in farm income by type of farm may or may not be expected, depending on whether resources are allocated to their best earning advantage. For example, if poultry farming showed a trend toward higher income returns, and if factors of production were perfectly transferable, we would expect a shift away from non-poultry farms to higher paying poultry production until rates of return were equal between all types of farms. Of course, neither factors of production for different types of farms, nor skills required for their operation are perfectly transferable.

40. On the basis of the highly aggregative analysis reported thus far, total farm family income appears to be positively related to location (in certain provinces as against others), non-farm residence, large family size, high level of education, higher economic class of farm, higher farm capital value, opportunities for off-farm income, certain types of farms. Six of these characteristics - farm location, off-farm income as a major source, family size, economic class of farm, capital value and types of farms - stand out as being not only strongly and positively correlated with total farm family income but significant for a large majority of census-farm families. There is less certainty about the importance of residence and education. As for farm size and tenure, there seems to be little or no relationship with levels of total farm family income.

41. The findings summarized above are further evaluated and extended in more detailed analysis by comparing average characteristics of census divisions in which average per capita income of farm family members is less than \$1,400 or greater than \$2,500. (All census divisions qualifying are listed in footnote 1 of Table 3.5.) Census divisions with higher farm family incomes are characterized by (i) lower proportions of farm income as a major source of total family income, (ii) higher agricultural sales (note that the first does not necessarily preclude the second), (iii) higher capital value of farms, (iv) lower family size (just the inverse of the previously observed family size income relationship), (v) higher level of education of farm operator member, (vi) greater number of hens per farm (i.e., poultry farms), (vii) greater number of days of off-farm work by the operator (supportive of (i) above), and (viii) higher proportion of farm operators with off-farm occupations (also supportive of (i) above).

Two additional associations to be noted are that a larger proportion of farm operators worked less than 39 hours per week for the lower family income census divisions, and a larger proportion of the higher income farm families were located near or in a census division with a large urban centre. The former variable indicates underemployment and may also indicate prevalence of operators in the retirement category. This variable is consistently highest where incomes are lowest (namely, in the Maritime provinces). The latter variable relates to proximity to larger labour markets and serves as a proxy for lower cost of transporting farm products, higher prices for farm products, etc. Finally, there is little difference in size of farm between the two groups.

42. A correlation analysis, using average values for 252 census divisions on a wide range of variables, further suggests that variables bearing most on levels of farm family incomes include higher economic class of farm, greater capital value, greater emphasis on meat production (hens, cattle), greater rental of land, more days of off-farm work, presence of an off-farm occupation or off-farm income as the major source, higher education, and closer proximity to urban areas. Again, size of farm holding does not seem to be related to levels of total farm family income.

43. The relative importance of potential influences in farm family incomes is further evaluated, using multiple stepwise regression. Determinants of farm family income were expressed as a function of sets of farms, farm operator and farm family endowments. Again, 252 census divisions were used as units of analysis. The regressions were performed for all 252 census divisions and three contrived regions — the mid-west ($N = 53$), mid-east ($N = 155$) and east ($N = 44$). Findings are:

(i) For Canada as a whole ($N = 252$), all variables considered take on the expected sign. Capital value (+ effect), and days of off-farm work (-) account for the largest share of the variance in farm family income. Both have a relatively high regression coefficient and low standard error for the mid-west region and mid-east, but less for the eastern region.

(ii) The variables, average family size (+), proportion of farm operators that are owners (-), urban proximity (+), and percentage of total farm family income deriving from the farm operator (-) consistently demonstrate the expected sign for Canada and the contrived regions.

(iii) Variables to do with farm operator education (e.g., proportion with less than Grade 9 education), an observed negative effect, and proportion of farms producing meat products (a + effect), each take on the expected sign for Canada and two regions. However, standard errors of the regression coefficients are acceptable only for Canada and the eastern region for the education variable and only for Canada for the "meat producing" variable.

(iv) Our findings in terms of (a) the ratio of regression coefficients to their standard errors and (b) findings among regions lead to the conclusion that the **farm component** as expressed by farm capital value is about equally useful in accounting for variations in total farm family income as is the **farm operator component** as represented by operator's days of off-farm work. In contrast, the **farm family component**, as represented by average family size and urban proximity, is least significant.

44. As for policy implications, our regression results provide few guidelines. About all that can be said at this juncture is that there seems to be a close trade-off between investment in capital stock of farms toward increasing income from farming, and developing off-farm work opportunities toward increasing off-farm employment revenues. Frankly, our insights into the farm/non-farm contribution are of greater significance in understanding structure of Canada's farm sector than the behaviour of individual farm family production functions.

45. We have shown that less than one half of Canada's census-farm families earn their major source of income from farming, that a large share of Canada's farm operators work off-farm, that less reliance on farming is very closely associated with small marginal farm operators, and that a small share of Canada's farms are assuming an increasingly important role in production of total agricultural products. This led us to question whether these trends were signifying doom of the family farm.

To evaluate this question we defined a family farm as "... a primary agricultural business in which the operator is a risk-taking manager who, with his family, does most of the farm work and performs most of the managerial activities". With this in mind, we found that, while there have been significant structural changes in the nature of farming and reliance on family farms, the role of the family (i.e., operator and other members) in operations of the farm has not been diminished. Even if we could argue with certainty that the farm operator performs less in marketing his final products and earns a larger share of his income from off-farm work, the same applies to both the small- and the large-scale farm operator. In sum, while production and land are clearly concentrating, the fact is that concentration is in a rapidly expanding number of adequately sized farms of medium and large size. Thus, it would seem important in revising the definition of

a census-farm not to revise its emphasis on **family farm units** but on the contribution of the farm to Canada's gross agricultural sales *in toto*, and on the reliance of the family on farming as a means of livelihood.

46. A problem in typologizing low versus high income operators is that total earned income cannot be adequately understood merely in terms of **farm performance**. Subgroups within a seemingly "homogeneous" population of census-farm operators are highly dissimilar with respect to sources of income and economic activity. For example, off-farm employment plays an impressive role in reshaping a rather depressing "net self-employment farm income distribution". For Canada, we observe that 73.6% of all operators have less than \$3,000 total income if we consider income from farming only. This proportion drops 30% when effects of off-farm employment income are added. The drop is as high as 60% for British Columbia.

47. Of those in the low income category (42.2% of all census-farm operators), almost 80% (36.4% of all operators) earn less than \$2,000 from farm and off-farm employment income combined. The average total income of these operators is a low \$1,004. This is considerably lower than the implied base level of \$2,900 which was derived using Statistics Canada low-level income cut-offs.

Among those with less than \$2,000 total income, approximately 20% (25,700 or 7% of all census-farm operators) rely largely on government transfers. Clearly, an important consideration in typologizing incomes is whether the farm operator is (i) an income earner, (ii) predominantly retired and relying on government transfers, or (iii) receiving government transfers because of farming losses.

An analysis of those receiving government transfers reveals that approximately 50% are over 65 years of age and operate small marginal farms. This means that the "retirement category" (about 10,000 operators) is a discernible subgroup of the 100,000 or so that report less than \$2,000 total income. About 15,000 census-farm operators with total income less than \$2,000 and less than 65 years of age also report government transfers as their major source as well. This serves as a crude indication of those seriously "suffering" from zero or loss net self-employment farm income as they appear to have little off-farm self-employment income.

Over-all, of the 36.6% of Canada's census-farm operators that report "zero or loss" income from farming, five major groups can be identified as being relevant for a low/high income typology for farm operators. These are:

Group	Share %	Characteristics
1	3.6	in the retirement category (age 65 and over), with total incomes less than \$2,000, operating small farms (sales less than \$5,000), and reporting government transfers as a major source of income;
2	3.7	largely operators of farms located in the Prairies who have little or no off-farm employment income, and who rely on government transfers as a major source of income;
3	3.7	largely operators of farms located in the Prairies that have little off-farm income, total incomes less than \$2,000, and rely on wages and salaries or other investment income as a major source;
4	5.4	operators with less than \$2,000 from all sources who rely largely on their farms for economic livelihood; and
5	20.0	operators with over \$3,000 total income; 10.6% with total income over \$6,000; 3.8% with total income over \$10,000, of which about half have off-farm occupations and some university education or more.

If genuine "zero or loss" income from farming has been experienced by anyone, it is likely to have been experienced by members of Groups 1, 2 and 3 (about a third of all operators reporting "zero or loss"). Possibly, some or all of Group 4 could be added to Groups 1 - 3. With respect to Group 5, however, certainty about legitimacy of "zero or loss" farm income decreases. In the light of previous reasoning (Chapter 4), we suspect that returns to farming have been understated towards reducing taxable income, as operators in this group derive the majority of their income (i.e., all of their positive income) from off-farm sources.

48. Bearing the considerations above in mind, five major influences or conditioners of total earned income of farm operators are hypothesized for a high/low income typology. These are (i) human factor endowments conducive to higher productivity, regardless of whether the job is self-employment farming or some off-farm occupation (e.g., endowments such as age, higher education, diversity of occupational skills), (ii) scale of farm enterprise (e.g., characteristics bearing on economies of scale such as size, capital value, value of machinery, etc.), (iii) opportunities for off-farm work (e.g., availability of off-farm jobs as a means of supplementing low incomes), (iv) regional income returns (e.g., over-all prosperity of the region bearing on higher prices paid for farm output, higher wages for non-farm workers and higher demand for non-farm labour given local growth and development), (v) risk involved in self-employment activity (e.g., risk of epiphenomenal losses more likely to be experienced at some types of farming than others).

49. Classificatory power of the typology was evaluated using **least squares discriminant analysis** – a technique specifically designed to explore problems of classification by highlighting the significant differences among different groups of subjects. The discriminant analysis was applied to three subgroups of census-farm operators within each census division: those with total incomes less than \$2,000 (the low income subgroup = a total of 105,000 operators in 252 census divisions for Canada), those with total income between \$2,000 - \$9,999 (the medium income subgroup – 221,000), and those with total incomes exceeding \$10,000 (the high income subgroup – 45,000 for Canada). For each subgroup, average farm operator and farm characteristics were tabulated for each of the 252 census divisions. The discriminant analysis seeks to identify major differentials between the low versus high subgroup combinations (i.e., low versus medium, low versus high, medium versus high). Thus each discriminant function works with empirical measures on two operator subgroups for 252 census divisions (i.e., $N = 252 \times 2 = 504$).

50. Our procedure in employing the discriminant analysis has been to evaluate factors in the typology independently at first and then in combination with other factors. This allows evaluation of the relative discriminatory power of indices of each factor in discerning low from high income operators. In order of importance, discriminators of operators with low versus high incomes are (i) measures to do with opportunities for off-farm work, (ii) labour force status, (iii) measures to do with endowments for off-farm work, (iv) measures describing scale of farming, and (v) regional differentials in wage and salary remuneration.

51. Previous to regressions on **areal** variations in farm performance, such as variations in average farm and farm operator characteristics, we discuss why aggregate data at the census division level, and a number of unmeasurables, confound the rigour of our evaluation and the utility of our findings. The point to be borne in mind is that multi-variate techniques have been used more toward ordering the confusion among a large number of possible influences in area variations in farm performance than to rigorously calibrate elasticities in the farm performance equation.

52. As a measure of **farm output**, we use gross farm sales. Aside from errors due to recall, this statistic may be one of the most accurate census-farm income figures. For example, as sales figures do not take into account depreciation, they are not likely to suffer from contrived depreciation allowances or farm investments aimed at building up farm capital stock. Also, as farm sales are reported as a gross figure, there would seem to be little advantage in misreporting sales for tax reasons. The only apparent problem in using sales figures is that they do not include farm production that has been consumed as income in kind. Thus, performance of small-farm holdings will tend to be underemphasized. Also, unsold surpluses such as stored grains or cattle withheld from slaughter will not be reflected in farm sales.

53. In our attempt to account for variations in average gross farm sales, we decided not to use select farm expenditures as an index of farm magnitude. While this variable was highly correlated with gross farm sales ($r = 0.80$), its utility was

questioned given problems of census measurement, the highly aggregative nature of the variable and its exclusion of the value of fixed capital. As an alternative, a number of indices of farm magnitude were used in conjunction with a number of indices of farm type and operator characteristics. As with our analysis of total farm family income, all regressions were performed for Canada (252 census divisions as units of analysis) and three contrived regions (mid-west, mid-east, east).

54. On the whole, we found that average value of farm capital is the most significant correlate of differentials in magnitude of farm sales. Log stepwise regressions allow some generalization that elasticity of farm sales with respect to capital is about twice that of any other variable in the equation. On the other hand, if capital value is represented alone in the regression, the elasticity is slightly above 1.0.

In terms of statistical significance, elasticity, and contribution to R^2 , the variables "proportion of farm area fertilized" and "proportion of poultry farms" make the next largest contribution in accounting for area variations in gross farm sales. Neither finding is particularly startling, as it is well known that fertilizer has played an increasingly important role in Canadian farming, and that, on average, those involved in the production of poultry, dairy and cattle products have enjoyed higher returns.

With respect to a number of remaining variables considered, it is difficult to generalize about their relative bearing on farm sales except to say that each consistently demonstrates the expected sign. The relationship between the proportion of operators with an "off-farm occupation" and "farm sales" is, as expected, negative (i.e., expected given findings and discussion in Chapter 4), although it fails to be significant for the mid-west and eastern regions. Average family size has the expected positive effect (i.e., a surrogate of cheap or unpaid family labour), but it is statistically significant for only one region. Finally, the positive bearing of "number of cattle per farm" and "operators with greater than Grade 12 education" on variations in farm sales accords with physical and human capital expectations. However, statistical significance and elasticities are largely uneven among regions.

55. Additional correlations of some interest are between farm sales and both operator's education and type of farm. Variations in "proportion of operators with less than Grade 9 education" does not seem to be associated with variations in farm sales. One reason may be that a large proportion of farm operators in each census division have less than Grade 9 education, meaning that there is little variation in this independent variable. While this is a statistical problem which tends to undermine the regressions, we still observe a low elasticity in level of farm sales with higher "proportions of operators with greater than Grade 12 education". This finding suggests that variations in education play a small role in average levels of farm sales. With respect to farm type, larger proportions of dairy and poultry farms are positively associated with average farm sales, while larger

proportions of wheat farms are negatively correlated with sales. As noted previously, the latter finding is probably partly attributable to the voluntary and government-induced crop cut-backs in 1970 (see Section 2.7.2).

56. While we conducted essentially the same analysis as above, using net self-employment farm income as a measure of farm performance, results are highly questionable. The reason is that, of the four major income variables used in this study (i.e., farm sales, net farm income, off-farm income, total income), net farm income is likely to be the most inaccurate (see Section 5.3).

57. Questions about the reliability of reported net self-employment farm income brought us again to the who's and why's of reported zero or loss farm income. From a policy point of view, it seems quite important to quantify the extent to which links exist between "proportions of operators with off-farm occupations", and the tendency to report "zero or loss farm income". That is, if areas with low average net farm incomes are populated largely by small-scale farm operators who (i) report off-farm occupations during census week, and (ii) zero or loss farm incomes, then there is every reason to assume that these farm areas are not as badly off as they seem. Operators reporting off-farm occupations typically derive higher incomes than those reporting only farm occupations.

All indications are that "proportion of operators with off-farm occupations" is an important key to understanding the prevalence of net farm zero or loss income. Additional correlations in support of our claims are between "average proportion of operators reporting zero or loss farm income" and "proportion of farm area under crops" (-0.42), "average crop area" (-0.46), "average farm area fertilized" (-0.39), "average number of cattle" (-0.30), "days of off-farm work" (0.71), "average number of tractors per farm" (-0.33), "proportion of operators with greater than Grade 12 education" (0.31) (i.e., all indications of lower involvement in farming). Further analysis of the characteristics of operators with specific off-farm occupations provides further support for the conclusion above.

58. The finding above leads us to conclude that the presence of operators with "off-farm occupations" tends to obfuscate meaningful interpretation of farm asset, input and output relationships. For example, farm performance as measured by farm sales or net farm income seldom seems commensurate with value of farm capital stock. Clearly, the presence of an off-farm occupation seems to be an intervening variable which, for reasons enumerated above, exercises an independent influence on indices of farm performance.

From a policy point of view, the presence of these operators may bear inaccurately on inferences about returns to farming *per se* and what seems possible (in terms of performance), given the profile of farm assets. Isolating specific areas where these operators proliferate is no easy matter. According to our data, they hold 15.2% of Canada's farm land, 18.6% of Canada's farm capital, 14.2% of Canada's total farm sales, yet only 2.2% of Canada's total net farm income. In Nova Scotia, the proportions are considerably higher, while in Canada's "purest" farm province of Saskatchewan, these operators still operate 10.8% of the province's farm land. If there is a lesson to be learned here, it is that

before judging the actual and potential prosperity of farm areas it will be important to (i) identify the extent to which operators with off-farm occupations report zero or loss incomes when characteristics of their farms indicate either that farm income should be higher or that the operator's wealth has been growing due to capital deepening, and (ii) identify the extent to which reported zero or loss farm income is related to differentials in levels of off-farm earnings that exist between areas of varying prosperity.

59. Another indication of farm performance is the rate at which farming has been abandoned as a means of earning a living. We have already established that there is non-parity of incomes between agricultural and non-agricultural types of work. To a large extent, this is due to prevalence of small-scale farms with poor prospects of viability given increasing cost-price squeezes, etc. The rate at which farms decline in any particular area was hypothesized to be a function of (i) the proportion of small-scale farms in the area (a positive effect), (ii) prospects of off-farm work as a means of supplementing low farm incomes (a negative effect presuming relocation is perceived as difficult, given the inertia attached with having been in one occupation for a considerable time, and a likely preference for farming as a way of life), (iii) opportunities to obtain full-time jobs which pay better than farming (a positive effect), (iv) proportion of operators of older ages, implying retirement and withdrawal from farming (a positive effect) and (v) government intervention to purchase small farms, relocate farm families to off-farm locations and sponsor or aid in consolidation of farms (a positive effect).

Our findings indicate that reduction in farm numbers is correlated with larger proportions of operators aged 65 and over (implying retirement migration), larger proportions of operators that are outright owners of their farms (an inertia effect), smaller proportions of operators with off-farm jobs (i.e., sources of off-farm employment income), and larger proportions of operators that are non-residents.

60. A problem throughout this study is that the relationship between farm performance and operator's education (as a measure of human capital) has been ambiguous and statistically questionable. In previous chapters, a positive relationship was observed between education and off-farm employment income but education did not seem related to self-employment farm income. The latter finding was attributable to difficulties in measuring farm self-employment income, possible misreporting of this income figure by more highly educated operators, etc.

While our regression results indicate farm sales are positively related to higher proportions of operators with greater than Grade 12 education, results are still questionable due to (i) problems of inconsistency of measurement, (ii) confounding of results due to the peculiarities of inadequately identified operator subgroups, and (iii) large proportions of operators in the lowest educational categories and small proportions in the highest educational categories (which tends to confound our regression analysis as variance in the education variable - in terms of the number of observations per educational level - is limited).

Towards evaluating the education farm productivity issue further, we asked whether upgrading the distribution of farm operators with respect to level of education would serve to improve farm performance. To shed some light on this question, we classified operators according to occupation during census week and then calculated average characteristics of their farms according to their level of education. Results indicate:

(i) Higher levels of education are clearly related to higher farm sales, regardless of the operator's occupation during census week. The observed major difference between the two occupation groups in level of sales was expected, given that the latter group is much less involved in the operation of farm holdings which, on average, are also smaller farm enterprises.

(ii) Generally, there is a positive relationship between education and net farm income for the "farmer" occupation group and an almost converse relationship for the non-farm occupation group. The latter finding is consistent with our previous hypothesis that the higher the off-farm income (typically reported by those holding off-farm occupations), the greater the tendency to report low farm income. Since those with higher levels of education are likely to earn more off-farm income at their off-farm jobs than those of lower educational attainment, this could imply motivation to report lower net farm incomes for tax purposes. At the same time, with higher incomes to be had at off-farm work and higher incomes to be had by these highly educated operators, they may have income to invest in their farm capital stock which is disproportionate to that implied by their farm sales minus their farm expectations. We could even speculate that these operators may be poor farm managers (possibly new entries to farming) and that they may tend to experiment with expensive breeds, invest far too much in machinery and other gadgets which may depress their net farm income.

There is a clear positive relationship between education and value of farm capital for both occupation groups. Admittedly, among the "farmer" group, capital value is more likely to be tied up in land, farm machinery and buildings than in residential or speculative real estate. While discernible positive differentials to education such as area of farms is also evident, the differentials are narrow (except for the Prairies). This is merely another testimony that land area *per se* is, on the whole, not particularly useful for distinguishing the magnitude or prosperity of farm area.

In sum, we conclude from our analysis of levels and trends, our regression finding, and the burgeoning literature on positive returns to education that there is every reason to assume that upgrading the distribution of operators by education will have a positive bearing on farm performance. In an industry where self-employed farmers are facing rapid technological and organizational changes, there is little novelty in the claim that higher education is conducive to improved management. However, when we consider that almost 60% of Canada's census-farm operators have less than Grade 9 education, it seems that one of the reasons for lagging farm performance among so many of Canada's farm operators may be due

to the failure of Canada's educational system to prepare farm operators adequately for their profession. Admittedly, many of those with less than Grade 9 education are older operators who were educated at a time when completion of Grade 8 was the norm, whereas young operators tend to be centred in the higher education brackets to a much greater extent. However, it does not follow that the educational profile of Canada's census-farm operators can be expected to improve with attrition.

61. A final exercise seeks to identify census divisions where small, seemingly unviable and inadequate farms are most prevalent (i.e., those census divisions requiring most help). Farms were deemed as small, seemingly unviable and inadequate as a source of economic livelihood if (i) their farm sales were consistently below \$5,000, (ii) they are managed by an operator with few prospects of off-farm employment income (e.g., less than \$2,000 per year), and (iii) they are managed by an operator of economically active age (implying a high probability of dependent spouse and children). This definition is operationalized, and estimates of proportions of farms that meet the criteria above are made for each census division. These proportions are compared with the proportion of farm operators in each census division relying on government transfers as a major source of income. While we find that level of government transfers seems to be positively correlated to our estimates of "inadequate farms", exceptions exist and are discussed.

6.3. Suggestions for Further Research

Our concern here is simply to mention a few research questions which seem central to effective agricultural planning but for which answers are, as yet, largely unknown.

1. Although a considerable portion of this study has been devoted to evaluating economic returns to farm and non-farm employment, there remains a number of perplexing questions concerning farm operator and farm family (i) cash income, (ii) accumulated wealth, (iii) income in kind, and (iv) pecuniary versus non-pecuniary returns to living and working in farm areas.

To this reviewer, one of the most important questions for future research has to do with combining estimates of cash income, income in kind and wealth for the purpose of drawing comparisons between farm and non-farm households. Our intersectoral income comparisons (see Chapter 2) leave much to be desired as we have not interpreted the importance of accumulated farm capital on the relative economic well-being of families. Thus, while total cash incomes of census-farm families (unadjusted and adjusted for income in kind), indicates notable discrepancies between the farm and non-farm sector, we do not know the extent to which accumulations of farm capital (say, about \$65,000, on average for census-farm families) places farm families at a relative advantage, disadvantage or on a more equal footing with non-farm families. To answer such questions, we require considerably more detailed data on family ownership of farm and non-farm capital, indebtedness, etc.

One approach to this question has been proposed by Carlin, *et al.* (1973). It involves translating farm capital value (a stock concept) into a yearly income flow. Another approach would be to estimate the economic well-being of farm versus non-farm families or individuals at retirement, given the capital value of their holdings and differentials in anticipated retirement pensions, etc. Of course, the greater the refinement in evaluating such questions, the greater the need for detailed survey data.

As an extension of the above, we can add that our farm/non-farm income comparisons would be much improved if (i) survey research could produce some estimate of the extent to which farm earnings are ploughed back into the farm enterprise toward building up capital stock, and (ii) the legitimacy or consistency of reported cash income from farming could be evaluated in the light of income tax returns. Indeed, the latter consideration is directly related to our hypotheses concerning reported "zero or loss" income from farming among those with high off-farm employment earnings (see Chapter 4).

2. Another important question for further research concerns census-farm operators who seem to be poverty cases. Do these operators perceive themselves as being locked helplessly into agriculture due to imperfections in the labour market (i.e., implying a need for policy interventions to relocate farmers to non-farm jobs)? Or is there a strong inertia effect due to the length of time spent in one occupation, perceived non-pecuniary advantages to remaining in farming, etc.? Does this inertia effect serve to motivate operators to secure off-farm work towards keeping unviable farms afloat or do low income operators perceive small-scale farm/part-time employment combinations as a desirable state *per se*? How do the growing ranks of small-scale/part-time operators in Canada compare with farmers in other developed economies? In many respects these questions require sociological analysis; again, the need for micro-survey research is apparent.

3. Towards identifying geographic variations in returns to farming and farm family well-being, many of our income disaggregations have been across provincial boundaries. Yet, just as large variations have been observed between Ontario and the Maritimes, we can imagine large variations between the north and south of Ontario or the east and west of British Columbia. In short, spatial analysis in this study has been relatively narrow. Towards better understanding of Canada's farm population for regional policy purposes, future research would do well to determine where, for example, pockets of particular problems are most acute (i.e., based on analysis of clusters of census divisions).

4. While our results testify to a positive relationship between educational levels and self-employment farm income among those predominantly involved in farming, many questions remain unanswered. While it is safe to argue that increasing technological specialization in the production of farm goods requires improved management skills, there is considerable unclarity as to whether a largely classical education meets this need. It seems, to this reviewer, that upgrading education in ways that have been typically advocated by policy-makers would serve to endow farm operators more with credentials for off-farm jobs than with skills for more effective farm management.

5. How much do government aid programs and tax benefits keep the unviable farmer afloat? Do such benefits aid those most in need? Analysis of government transfers received by small-time or marginal farmers as well as tax benefits that may be enjoyed by those earning off-farm income, should give some idea of whether benefits are going to persons who (i) have unviable farms and little chance of off-farm employment, (ii) have good chances of off-farm employment, but little off-farm income due to residence in low opportunity areas, and therefore are forced to rely heavily on aid and tax benefits, or (iii) have good chances of off-farm employment, reasonable levels of off-farm income and benefit disproportionately from aid and tax benefits. Clearly, the latter category serves to confound the intended effect of aid and benefits to those described by (i) and (ii) above. The important consideration here, then, is not to deny aid and tax benefits to the needy, but to identify and eliminate those who manage to reduce the effectiveness of the pool of government transfer funds by drawing on that pool disproportionately to their relative need.

6. While there is little doubt that much of the future increases in production in Canada's farm sector will derive from larger farm units, effective agricultural policy may also be able to revitalize agriculture to provide more economic opportunities for small farmers with no loss in efficiency in terms of cost per unit of output. This may permit part-time farmers to derive a reasonable rate of return from their labour input in farming while, at the same time, maintaining a reasonable rate of return at part-time/off-farm work. An important research question in this case has to do with the nature of rural labour markets. As we know that rural labour markets are less structured than urban markets, that part-time workers have less job security, and that they are less likely to be covered by protective labour legislation and collective bargaining, the nature of part-time work may require some policy modification before farms can develop secure and stable part-time farm/off-farm work combinations (see Marshall: 1974).

Research on the kinds, duration and conditions of off-farm jobs of farm operators would provide useful information on this issue. Again, survey research would be required here and, as noted in 2 above, would be particularly useful if it sought to gauge farm operator preferences for part-time/off-farm work combinations.

APPENDIX A.1

DETAILS ON THE AG-POP LINKAGE SYSTEM

A.1.1. Introduction

The 1971 Ag-Pop Census data base had been created by linking information from independently derived records relating to the same persons (i.e., farm operators and members of their households). Application of computerized record linkage techniques has permitted matching of each Census of Agriculture record (representing agricultural characteristics of a farm operation), with a Census of Population records (representing population characteristics of the respective farm operator and members of his household).

The 1971 Census of Canada Ag-Pop data base is unique. Although record linkage techniques are not new as tools of social research, complete computerized collation of a country's national Censuses of Population and Agriculture is. This may come as a surprise, even though the merits of collating results of agricultural and population censuses were clearly spelled out by the United Nations nearly three decades ago (United Nations, 1947). To the author's knowledge, not even the less developed countries with large shares of their populations in the rural agricultural sector have attempted Ag-Pop linkages. Even in developed countries applications have been few and far between. For example, a project was undertaken in Canada by the Central Research and Development Staff of the Dominion Bureau of Statistics, using approximately 50,000 records from the 1961 Censuses of Agriculture and Population. In the United States, projects were undertaken co-operatively by the Bureau of the Census and the Economic Research Service of the United States Department of Agriculture both in 1950 and 1960. In 1950, approximately 11,000 records were matched. In 1960, approximately 7,400 records were matched manually from the 1959 Census of Agriculture and the 1960 Censuses of Population and Housing. In both the Canadian and United States projects, linkage applications were on a small scale (sample) basis and in only one case have results been published (United States, 1953). Possibly Canada's 1971 Ag-Pop data base, representing 100% linkage of agriculture and population census records, is without historical precedent.

A.1.2. Design of the Ag-Pop Record Linkage System

In the design of a record linkage system, factors such as expense, output deadlines, accessibility of records for computer processing and the precision of linkages required for intended studies assume a great deal of importance. In planning for the linkage of Canada's 1971 Censuses of Agriculture and Population, a number of constraining factors were imposed on the system design at the outset. Briefly, these included (i) tabulation deadlines for collated results, i.e., a need for linkage expediency, (ii) limited computer resources in the census program for the

linkage project, and (iii) limited cost allowances for manual checking of linkage discrepancies. These conditions required that much of the effort in the design of the Ag-Pop Linkage system be directed toward ensuring:

- (a) that all potentially linkable records could be easily identified,
- (b) that all records of concern were accessible on "cheap" working files,
- (c) that linkages could be performed in spite of discrepancies in identification information, and, of course,
- (d) that the linkage yielded reliable data.

Toward facilitating these objectives, the following steps were recognized as prerequisites to the automated phase of the linkage system.

Prerequisite 1

In the design of the potentially linkable records (i.e., schedule or questionnaire design), information common to each record should be adequate enough to provide, as nearly as possible, unique identification of each record pair.

The utility of this step should be self-evident. For example, if an identification code, unique to an individual such as a social security number could be used exclusively in separate derived record files, linkage of diverse records could be a routine matter.

In the design of the agriculture and population census records, provision was made for three geographic codes and one household number. Specifically, the codes consist of a provincial code (corresponding to 10 major divisions of the country - two digits), an electoral district code (ED, corresponding to approximately 225 population distributions and respecting provincial boundaries - two digits), an enumeration area code (EA, corresponding to approximately 13,000 areas covered by enumerators, having on average 140 households - two digits), and a household number (three digits). As the enumeration of each census was undertaken simultaneously, these codes were assigned on the census record by the enumerator at the time that the record was given to the respondent. Thus, a combination of these codes on each Census of Agriculture schedule (completed by a census-farm operator), and the respective Census of Population schedule (completed by the same operator and the members of his household), allowed unique identification of record pairs, *ceteris paribus*.

Prerequisite 2

Prior to the automated linkage of the records in the Head Office, a sample collation of potentially linkable records should be performed so as to verify that the persons referred to on each pair of schedules are in fact the same.

The function of this operation was to detect systematic flaws in the identification codes.¹ Accordingly, the operation served to reduce computer failures to perform potentially genuine linkages to a minimum and helped avoid the acceptance of false linkages. The operation was particularly crucial to the automated phase of a linkage system, as it served to minimize problems at the computer stage of the linkage, and consequently computer time and manual searches for discrepancies.

In preparation for the 1971 Census linkage system, alternate procedures for the identification and searching of deviant records were evaluated on the basis of studies using 1968 and 1969 Trial Census documents. For example, from the 1968 Trial Census, consisting of approximately 3,000 Census of Agriculture and 7,500 Census of Population questionnaires, a sample of 720 record combinations was performed by manual collation. The most significant problem in the collations resulted from inadequate enumerator recording of key geographic codes which were required to identify record pairs. Accordingly, the inclusion of a number of explanatory notes and emphasis on the codes during enumerator training led to significantly improved results in the 1969 Trial Census. Also in the clerical search for "deviant" records, it was found that access to the enumerator's "Visitation Record" greatly aided the location of errors on the records which otherwise would have led to linkage discrepancies.²

Prerequisite 3

After the transcription of the Census of Agriculture and Census of Population records to master census files (i.e., computer tape) has been completed, a working file (i.e., computer tape) consisting of only those agriculture and population records relevant for record linkage should be derived from the master file(s).

If (i) computer resources for the operation of the record linkage system are limited or (ii) if expediency of data output from the linkage is an important factor, or (iii) if the master files will be in constant demand for facilitating primary data programs, then computer time allotments and output deadlines can be optimized considerably through the manipulation of relatively small "working files". For example, after the processing phase of the 1971 Census, transcription of records into machine-readable form (i.e., magnetic tape) resulted in a master Census of Agriculture file consisting of approximately 366,000 records and two master Census of Population files consisting of approximately 6,000,000 and 2,000,000 records each.³ As these files are in constant demand for the programming of regular census tabulations, the derivation of a workable file for record linkage must be a primary concern. Accordingly, it was expected that one complete scan of the master population files will yield approximately 500,000 - 600,000 records which qualify for duplication on a working file. This estimate was based on the assumption that at least one person recorded on each

See footnotes on page 234.

record has been coded as a farm operator (during the searching stage) or reports either a farming occupation, farm industry or net farm income source. On the other hand, as all records on the master agriculture file are relevant for linkage, and as the file is relatively small, the complete file was duplicated.⁴

It was estimated that manipulation of the "working files" as against the master files would take approximately one eighth of the computer time (using an IBM 360/65). Also, given separate "working files", the linkage operation could be activated or terminated as required without affecting the scheduling of the master files. In effect, then, the linkage operation functioned as a separate system.

A.1.3. The Automated Phase of the Linkage

As general prerequisites to the automated phase of the record linkage system have now been outlined, let us consider those operations which were integral to the performance of the linkages themselves. Essentially, three tasks were involved. They include (i) a decision on the level of error to be tolerated, (ii) selection of the rules for linkage, and (iii) provision for the performance of linkages in spite of discrepancies in the required identification information. Each of these considerations must be integrated into the design of the automated phase of the linkage operation to ensure that all record matching possibilities could be combined accurately, efficiently and where necessary, via imputation or assignment.

Though decisions on the level of error to be tolerated in a pragmatic linkage application may be arbitrary (e.g., 5%), once the level is determined, the linkage rules must be precise in order to minimize spurious linkage combinations. This may be achieved largely in a test situation. For example, given a rigorous set of linkage rules and a tolerated margin of error in the performance of the linkages, estimates of the reliability of the expected linkage results can be based on a manual inspection of a sample of computerized record combinations. If the reliability of the linkage results is below acceptable tolerance levels, either the information required for the effective operation of the linkage rules can be reformulated towards improving their discriminatory power, or the linkage rules themselves can be reformulated towards an acceptable margin of error.

On the other hand, it must be recognized that the linkage rules do not guarantee 100% accuracy of all record combinations or the linkage of all records on the files. In each case, the size of the problem will be a function not only of the number of identification errors undetected in the operation described as Prerequisite 2, but also of the extent that identification errors have been introduced during the transcription of records to computer files. In the final or

See footnotes on page 234.

automated phase of the linkage operation, these discrepancies may be permitted to act as uncontrollable sources of error, unless they violate the tolerated margin of error, in which case they must be reduced to acceptable levels.

In order to illustrate the sources of identification errors in a linkage operation, the range of possible record combinations in a two-file linkage application has been summarized in Table A.1.1.

TABLE A.1.1. Potential Record Combinations in a Two-file Linkage Application

Records on File A	Records on File B			
	Records exits			Records are non-existent ¹ b ₄
	Correctly identified b ₁	Not correctly identified b ₂	Non-identified b ₃	
Records exist:				
Exist and correctly identified a ₁	Correct or positive linkage	Spurious or non-linkage	Non-linkage	Non-linkage
Exist but not correctly identified. a ₂	Spurious or non-linkage	Spurious or non-linkage	Non-linkage	Non-linkage
Exist but non-identified a ₃	Non-linkage	Non-linkage	Non-linkage	Non-linkage
Records are non-existent ¹ a ₄	Non-linkage	Non-linkage	Non linkage	

¹ Non-existent records: records lost in the transcription of records to Master files (or Magnetic Tape).

Aside from those records in categories a₁ and b₁, all other record categories will serve to confound the linkage rules. In those cases where linkage is detected and spurious record combinations result (i.e., a₁b₂, a₂b₁, a₂b₂), there is not a great deal that can be done when dealing with large record files except to verify.⁵ On the other hand, in those cases where linkage is not detected (combinations involving a₃ and a₄, b₃ and b₄), the records must either be examined manually (presuming availability of time and clerical resources), ignored or linked via imputation. On pragmatic grounds however, manual inspection of "deviant" cases would not receive much support, particularly if large numbers of records are involved. Accordingly, the derivation of an imputation or assignment scheme should be given serious consideration as a means of handling the unforeseen linkage discrepancies (i.e., combinations involving a₃ and a₄, and b₃ and b₄, Table A.1.1). If the scheme is at all comprehensive (e.g., based on detailed geographic referents and characteristics of respondents on "deviant" records), imputed or assigned record linkages may in fact result in correct record combinations.

A.1.4. Performing Linkages in the 1971 Census Program

In the automated phase of the 1971 Agriculture and Population Censuses linkage system, rigorous specifications were developed toward matching records from the "working files" of both censuses in a series of steps using criteria which decrease in detail from step to step. Figure A.1.1 illustrates the schematic approach.

In the first linkage attempt (Link I), agriculture and population census records were paired only if the combinations of identification codes (i.e., province, electoral district (ED), enumeration area (EA) and household number (HHLN NO.)) on each are precisely comparable. In this case, the provincial, ED and EA codes should have been 100% accurate because, in every case, these codes were verified against a master, provincial, ED, EA, "library".⁶ On the other hand, erroneous household codes were anticipated as a result of (i) inaccuracies in the "keying to tape" of the agriculture census records, and (ii) the microfilming and transcription to tape by means of a "Film Optical Sensing Device for Input to Computer or FOSDIC" of the population census records.⁷ In the former case, 100% verification yields an expectation of less than 1% error whereas in the latter case, the expectation of error was about 4% - 8%.⁸ Thus a failure-to-link ratio of approximately 5% - 9% was anticipated at the outset.

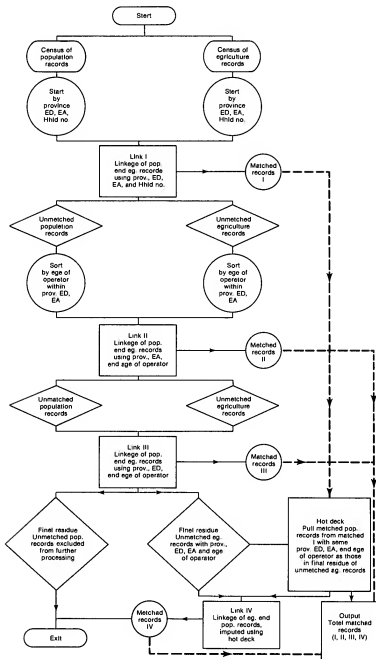
As unique identification of Census of Agriculture and Census of Population record pairs was possible, given the household number, those records which linked successfully during the first attempt represented positive or correct linkages (matched records I in Table A.1.1). Spurious linkages, resulting from erroneous household numbers, should be negligible at this stage, since a master edit scheme has been devised to detect and "flag" agriculture and population records with this discrepancy in order to inhibit spurious linkages. Accordingly, along with those agriculture and population census records that were not identifiable, these cases were added to the residual of unmatched records for the second step of the linkage. Given the failure-to-link ratio, this residue was expected to consist of 20,000 - 38,000 records or 10,000 - 19,000 potential record pairs.

In the second attempt to perform linkages (Link II), the household number was replaced by the EA code as the fundamental linkage criterion. Within enumeration areas then, linkages were attempted on the basis of the only variable common to both the agriculture and population census records, namely the age of the operator. This variable has eight categories upon which to select record pairs. Although the potential for incorrect or negative linkage exists, given 10,000 EA's and an estimated 20,000 - 38,000 unmatched records at this stage, the possibilities for linking an average of two to four unmatched records per EA on the basis of eight classifications were considerable.

See footnotes on page 234.

Figure A.1.1

Automated Sequence of Canada's Census Linkage System



In the third linkage attempt (Link III), the age variable was again used but at the next level of detail, the electoral district. Accordingly, the residue of unmatched records was prepared for a final assignment scheme (i.e., final residue in Table A.1.1). At this stage, estimates of the size of the final residue had not been made, whereas on speculative grounds we anticipated the residue would consist of less than 1% of the total.

The assignment scheme operated as a computerized "hot deck". In this context, the term "hot deck" implies the following steps:

- (a) each unmatched agriculture census record in the final residue was identified according to the EA code (representing the geographic location) and the age category for the operator (eight possible),
- (b) for each EA record classification by age, a corresponding agriculture census record, which was linked successfully with population census record, was located (from matched records, i.e., the positive or correct linkages resulting from Link I) and, from the record pair, the population census record was duplicated on an assignment file or "deck",
- (c) subsequently, the final residue of the unmatched agriculture census records was assigned to record combinations with the population census records that were placed on the assignment file (Link IV). Accordingly, the "Matched records IV" which resulted were added to "Matched records I, II, III", to constitute the complete output of the system.

In this scheme, linkage of the final residue of unmatched agriculture census records was the principal objective, whereas the final residue of unmatched Census of Population records were excluded from the system.

As a result of the linkage steps and the assignment scheme, all agriculture census records were combined in record pairs with their population census counterparts. Accordingly, as the population census was conducted on a one-third sample basis as against a 100% enumeration for the Census of Agriculture, a third of the record combinations (in principle) will consist of a collation of complete or full enumeration data (100%), for both censuses, whereas two thirds of the combinations consisted of full enumeration data from the Census of Agriculture with partial enumeration data from the Census of Population. This created problems of representativeness which were accounted for through a "blow-up" or weighting scheme based on all record combinations as the weighting "framework" and the one-third sample data record combinations (about 367,000) which were weighted towards 100% representation.⁹

See footnotes on page 234.

A.1.5. Performance of the System

Table A.1.2 reports on the linkage success rate. Over-all, performance was excellent. The author expected a "failure to link rate" of 5%-9% for Link I (Shaw, 1971). This may be contrasted with a more pessimistic "failure to link rate" of 15% offered by Scott (1973). The observed rate for Canada was just under 2%. A high of 3.9% was observed for Newfoundland and a low of 1.1% for Prince Edward Island. My expectation that something less than 1% of the records would be passed on for "assignment" was correct. A rate of 0.03% was observed for Canada with a high of 0.13% for Newfoundland and a low of 0.01% for New Brunswick.

TABLE A.1.2. Agriculture-Population Linkage Success Rate

Area	Total ¹	Link I ²	Link II ²	Link III ²	Imputed ²
		per cent			
Canada	366,128	98.02	1.17	0.78	0.03
Newfoundland	1,042	96.06	1.43	2.39	0.13
Prince Edward Island	4,452	98.85	0.63	0.50	0.02
Nova Scotia	6,009	98.56	0.94	0.48	0.02
New Brunswick	5,485	98.74	0.71	0.54	0.01
Quebec	61,251	98.00	1.35	0.61	0.04
Ontario	95,741	98.32	1.19	0.47	0.02
Manitoba	35,016	98.35	0.87	0.76	0.02
Saskatchewan	76,668	97.45	1.31	1.20	0.04
Alberta	62,781	97.85	1.16	0.96	0.02
British Columbia	18,575	98.30	0.82	0.86	0.02

¹ Total number of 1971 Census of Agriculture records for which a corresponding 1971 Census of Population record was sought.

² Percentage of 1 for which a corresponding Census of Population record was found at the Links I, II, III and imputed stages, respectively.

Possibly, performance of the system surpassed expectations because an important potential pitfall had not been overlooked. The pitfall concerns non-resident farm operators who typically own a farm in one area (with its respective enumerator and geographic and household codes) but reside in another (with its respective enumerator, etc.). Although enumeration instructions were provided on handling this problem, a number of identification errors were made at the regional level. Fortunately, additional processing time at the Regional and Head Offices permitted a manual (i.e., pre-automated) collation of all non-resident farm operator agricultural and population schedules. Thus, referring back to Prerequisite 2, our experience indicates need for a complete manual collation of all non-resident farm operator households and a sample collation of the balance. As far as record linkage is concerned, non-resident farm operators are becoming increasingly problematic as their size is increasing both absolutely from approximately 35,000 in 1966 to 40,000 in 1971, and relatively from approximately 7% in 1966 to 11% in 1971.

FOOTNOTES

¹ In the 1971 Census of Canada, this operation was conducted at a regional level when the Census of Agriculture and Population records were collected from the enumerators for "Regional Office processing". Only a temporary collation of the records was possible at this juncture, as all records were sent directly to their respective "Head Office processing operations".

² The "Visitation Record" is used by the enumerator to record the name of the head of the household to whom the questionnaire is administered and all geographical codes recorded on "his" questionnaire. This stage was particularly important for non-resident farm operators as they were not given a household number on their agricultural schedule but received one on their population questionnaire which was later coded on to the agriculture form.

³ The Census of Agriculture schedule has 199 questions and was enumerated on a 100% basis. The Census of Population consists of a short schedule of 35 questions and a long or sample schedule of approximately 75 questions (including all of those on the short schedule). The latter was administered on a 33 1/3% basis.

⁴ On the other hand, the Census of Population working file was derived as an inclusive file of not only census-farm operators but all others (on the sample schedules) reporting a farm occupation, farm industry or net farm income source. In turn, this file was split into two files: one consisting of records which did not relate to linkage, the other consisting of all records which were hand-collated to Census of Agriculture records during the searching operation (i.e., Prerequisite 2) and which received a code delineating the record as containing either a resident or non-resident census-farm operator(s).

⁵ Spurious linkage combinations at this stage of the linkage operation are largely the result of identification errors in the transcription of records to the computer files and errors which were not detected in the operation previous to the automated phase of the linkage, described as Prerequisite 2.

⁶ This is not to imply that either the enumerator reporting or automated recording of the ED and EA identifications are always correct. Rather, 100% accuracy of the codes will only result from a machine-editing process.

⁷ In this context "keying to tape" means the direct transcription of coded data onto computer-readable magnetic tape.

⁸ These estimates were based on preliminary results from the 1969 Trial Census and refer only to that part of the linkage operation which ends with the "FOSDIC" reading of the population census records and the "transcription to tape" of the agriculture census records.

⁹ For discussion of the weighting scheme, see Nargundkar, *et al.* (1968), Lucas, *et al.* (1969), and Freeman (1975).

APPENDIX A.2

VARIABLES CURRENTLY AVAILABLE IN THE AG-POP DATA BASE

In total, 240 variables are included in the Ag-Pop data base. These represent approximately 55% of the agriculture base and 80% of the population base. This study makes use of 86 variables originally selected for tabulation in the 1971 Census publication and research program (as designed by the Rural Data Section of the Census of Agriculture, Statistics Canada).

For each of the variables listed below, details are also available on pre-programmed variable disaggregations (e.g., for age: 15 - 24 years, 25 - 44 years, etc.). This information is provided in the Rural Data Handbook (1974), and may be obtained from the Rural Data Section, Census of Agriculture, Statistics Canada.

1. Age
2. Average Cumulative Schooling of Family Members
3. Class of Worker
4. Completion of Vocational Course
5. Crops Reported
6. Days of Off-farm Work
7. Labour Force Activity¹
8. Economic Class of Farm
9. Family Membership
10. Full- and Part-time Work
11. Household Facilities
12. Household Head Status
13. Incidence of All Income Sources
14. Industry Divisions
15. Level of Schooling
16. Level of Schooling of Family Head
17. Livestock and Poultry Reported
18. Location of Farm
19. Machinery Reported
20. Major Source of Family Income
21. Major Source of Household Income
22. Major Source of Income
23. Net Self-employment Farm Income

See footnote(s) on page 238.

24. Number of Automobiles per Household
25. Number of Income Earners by Number of Income Recipients
26. Number of Months Residing on Farm Holding
27. Number of Moves Since June 1, 1966
28. Number of Persons per Room
29. Number of Rooms per Dwelling
30. Number of Year-round Workers
31. Occupation Stated During Census Week
32. Occupation - Work Experience
33. Off-farm Employment Income
34. Off-farm Occupation Reported
35. Operator's (Family) Head Status
36. Operator's Household Head Status
37. Operator's Total Employment Income
38. Per Capita Family Income
39. Per Cent of Total Employment Income from Farming
40. Per Cent of Total Employment Income from Farm Self-employment
41. Per Cent of Total Family Income Contributed by the Operator
42. Per Cent of Total Family Income from Farming
43. Per Cent of Total Household Income Contributed by the Operator
44. Per Cent of Total Household Income from Farming
45. Per Cent of Total Income from Farming
46. Per Cent of Total Income from Off-farm Employment
47. Per Cent of Total Land Improved
48. Per Cent of Total Land Irrigated, 1970
49. Period of Immigration
50. Place of Residence, June 1, 1966
51. Principal Heating Equipment by Fuel
52. Relationship to Family Head
53. Relationship to Household Head
54. Relationship to Operator
55. Residence Location
56. Sex
57. Size of Family
58. Size of Farm

59. Size of Household
60. Sources of Employment Income
61. Tenure
62. Tenure of Dwelling
63. Toilet Facilities
64. Total and Average Employment Income
65. Total Employment Income
66. Total Family Income
67. Total Household Income
68. Total Income
69. Total Income from Farming
70. Total Income of the Household Head
71. Total Value of Selected Expenditures
72. Type of Dwelling
73. Type of Family
74. Type of Farm
75. Type of Farm Organization
76. Type of Household
77. Type of Selected Expenditures
78. Usual Hours Worked
79. Usual Place of Work
80. Value and Kinds of Agricultural Products Sold
81. Value of Farm Capital (\$100)
82. Value of Total Farm Capital
83. Wages and Salaries
84. Wages and Salaries Plus Non-farm Self-employment Income
85. Water Supply
86. Weeks Worked

FOOTNOTES

- ¹ Not in alphabetical order due to change in wording.

APPENDIX A.3

APPENDIX TABLES TO CHAPTER 2

TABLE A.3.1. Average Total Income and Percentage Distribution of Census-farm Operators by Categories of Farms and Off-farm Employment Income, Provinces, 1971

No.	Employment income	Farm income				
		Less than \$2,000	\$2,000 - 4,999	\$5,000 - 9,999	\$10,000 - 14,999	\$15,000 and over
	Newfoundland:					
1	Less than \$2,000	1,668	3,631	8,378	11,543	—
2	\$ 2,000 - \$ 4,999	4,007	5,653	—	—	—
3	5,000 - 9,999	6,738	10,277	—	—	—
4	10,000 - 14,999	11,120	—	18,140	—	—
5	15,000 and over.	22,458	23,120	—	—	—
	Prince Edward Island:					
6	Less than \$2,000	1,280	3,637	7,152	12,286	12,271
7	\$ 2,000 - \$ 4,999	3,689	6,652	10,666	—	—
8	5,000 - 9,999	6,889	9,014	—	17,865	35,170
9	10,000 - 14,999	12,176	19,220	—	—	—
10	15,000 and over.	32,118	37,570	26,000	—	—
	Nova Scotia:					
11	Less than \$2,000	1,483	3,905	7,131	12,855	23,132
12	\$ 2,000 - \$ 4,999	3,910	6,258	11,521	—	—
13	5,000 - 9,999	6,607	12,268	12,567	18,690	—
14	10,000 - 14,999	12,397	15,170	—	—	—
15	15,000 and over.	24,804	27,541	23,816	—	—
	New Brunswick:					
16	Less than \$2,000	1,252	3,615	7,159	12,510	33,308
17	\$ 2,000 - \$ 4,999	3,800	6,838	8,992	—	—
18	5,000 - 9,999	7,093	9,252	15,001	—	21,470
19	10,000 - 14,999	11,002	13,102	—	—	—
20	15,000 and over.	20,524	19,905	—	—	—
	Quebec:					
21	Less than \$2,000	1,625	3,772	7,144	12,561	22,022
22	\$ 2,000 - \$ 4,999	4,095	6,655	10,030	15,759	21,631
23	5,000 - 9,999	7,178	10,401	13,567	20,205	36,545
24	10,000 - 14,999	12,137	15,365	18,802	23,159	35,560
25	15,000 and over.	23,805	25,251	28,855	38,748	46,840

TABLE A.3.1. Average Total Income and Percentage Distribution of Census-farm Operators by Categories of Farms and Off-farm Employment Income, Provinces, 1971

Farm income					No.
Less than \$2,000	\$2,000 - 4,999	\$5,000 - 9,999	\$10,000 - 14,999	\$15,000 and over	
per cent					
45.9	8.1	1.9	0.5	—	1
22.0	1.0	—	—	—	2
16.3	1.0	—	—	—	3
1.5	—	0.5	—	—	4
1.0	0.5	—	—	—	5
41.9	21.2	5.6	0.6	0.4	6
17.4	1.1	0.3	—	—	7
8.2	0.6	—	0.3	0.1	8
1.4	0.1	—	—	—	9
0.7	0.1	0.1	—	—	10
37.7	11.7	3.1	0.7	0.5	11
25.7	1.2	0.3	—	—	12
13.9	0.7	0.3	0.1	—	13
2.1	0.4	—	—	—	14
1.6	0.2	0.3	—	—	15
39.5	12.2	14.1	0.5	0.4	16
22.8	0.9	0.3	—	—	17
13.6	0.6	0.5	—	0.1	18
2.5	0.3	—	—	—	19
1.1	0.4	—	—	—	20
30.0	26.3	7.0	1.1	0.7	21
15.4	2.2	0.3	0.1	—	22
10.8	1.5	0.3	—	—	23
1.9	0.6	0.1	0.1	—	24
0.9	0.4	0.1	—	—	25

TABLE A.3.1. Average Total Income and Percentage Distribution of Census-farm Operators by Categories of Farms and Off-farm Employment Income, Provinces, 1971 — Concluded

No.	Employment income	Farm income				
		Less than \$2,000	\$2,000-4,999	\$5,000-9,999	\$10,000-14,999	\$15,000 and over
	Ontario:					
1	Less than \$2,000	1,158	3,950	7,544	12,691	25,977
2	\$ 2,000 - \$ 4,999	3,941	6,852	10,360	17,193	26,206
3	5,000- 9,999	6,995	10,399	14,092	18,836	37,531
4	10,000- 14,999	11,543	15,441	19,284	23,028	32,490
5	15,000 and over	25,314	27,747	35,581	39,931	51,400
	Manitoba:					
6	Less than \$2,000	825	3,635	7,350	12,446	22,842
7	\$ 2,000 - \$ 4,999	3,515	6,792	9,678	15,434	34,459
8	5,000- 9,999	6,727	10,433	14,408	19,830	23,648
9	10,000- 14,999	11,443	16,016	19,165	24,233	—
10	15,000 and over	23,749	27,384	35,076	36,510	47,082
	Saskatchewan:					
11	Less than \$2,000	799	3,759	7,360	12,478	23,315
12	\$ 2,000 - \$ 4,999	3,632	6,571	10,053	14,416	20,687
13	5,000- 9,999	7,044	10,518	13,813	19,186	24,630
14	10,000- 14,999	11,586	15,647	18,985	23,016	39,557
15	15,000 and over	21,831	25,448	30,690	35,250	35,540
	Alberta:					
16	Less than \$2,000	575	3,750	7,384	12,712	26,938
17	\$ 2,000 - \$ 4,999	3,438	6,508	10,136	14,856	23,880
18	5,000- 9,999	6,745	10,427	13,841	19,638	28,072
19	10,000- 14,999	11,203	15,518	19,209	23,168	35,385
20	15,000 and over	23,800	26,170	30,694	49,203	47,863
	British Columbia:					
21	Less than \$2,000	1,362	4,136	7,978	12,099	24,091
22	\$ 2,000 - \$ 4,999	4,001	6,773	10,469	—	26,580
23	5,000- 9,999	7,424	10,595	14,358	17,441	31,681
24	10,000- 14,999	11,485	15,546	19,577	24,307	32,140
25	15,000 and over	23,730	27,713	35,207	54,516	50,114

TABLE A.3.1. Average Total Income and Percentage Distribution of Census-farm Operators by Categories of Farms and Off-farm Employment Income, Provinces, 1971 — Concluded

Farm income					No.
Less than \$2,000	\$2,000 - 4,999	\$5,000 - 9,999	\$10,000 - 14,999	\$15,000 and over	
per cent					
30.8	16.0	7.7	2.1	1.6	1
10.9	1.5	0.3	0.1	0.1	2
18.1	1.6	0.4	—	0.1	3
4.6	0.5	0.1	—	—	4
2.8	0.5	0.3	0.1	0.1	5
45.9	19.4	6.0	1.4	0.8	6
11.4	1.3	0.3	—	—	7
9.1	0.7	0.2	—	—	8
1.5	0.3	—	—	—	9
1.1	0.2	0.1	—	—	10
44.3	22.8	8.5	1.8	1.0	11
8.2	1.3	0.3	—	—	12
7.3	0.8	0.3	—	—	13
1.8	0.4	0.1	—	—	14
0.8	0.2	0.2	—	—	15
38.2	18.6	7.9	2.0	1.5	16
10.7	1.4	0.3	0.1	0.1	17
11.1	1.1	0.4	—	—	18
3.1	0.5	0.2	0.1	—	19
1.9	0.5	0.2	0.1	0.1	20
27.6	7.9	5.3	1.4	1.2	21
12.6	1.4	0.4	—	0.1	22
26.7	1.7	0.5	0.1	0.2	23
7.8	0.5	0.2	0.1	—	24
3.3	0.4	0.6	0.1	0.1	25

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971

No.	Area	Average total operator income	Average employment income		
			From farming	Non-farm self-employment	Wages and salaries
		1	2	3	4
			dollars		
1	Canada	4,897	1,682	437	2,094
2	Newfoundland	4,037	669	504	2,113
3	Division No. 1	4,273	526	493	2,402
4	" " 2	3,534	161	477	2,219
5	" " 4	3,260	509	499	1,522
6	" " 5	4,677	1,318	1,081	1,898
7	" " 6	7,347	2,011	322	4,144
8	" " 7	2,567	1,058	130	871
9	" " 8	4,541	1,163	601	2,183
10	" " 9	2,646	545	513	813
11	" " 10	-	-	-	-
12	Prince Edward Island	3,799	1,443	331	1,419
13	Kings	3,440	1,216	487	1,106
14	Prince	3,691	1,556	347	1,165
15	Queens	4,029	1,451	253	1,742
16	Nova Scotia	4,388	935	504	2,235
17	Annapolis	3,821	667	406	2,184
18	Antigonish	4,828	1,445	482	2,293
19	Cape Breton	5,677	1,945	276	2,677
20	Colchester	3,723	1,253	379	1,487
21	Cumberland	3,900	822	367	1,974
22	Digby	3,564	193	702	1,908
23	Halifax	4,226	929	610	2,174
24	Hants	4,894	1,041	411	2,700
25	Inverness	3,857	573	436	2,101
26	Kings	5,071	1,170	521	2,545
27	Lunenburg	4,001	612	892	1,905
28	Pictou	4,447	749	527	2,376
29	Queens	3,642	556	573	2,028
30	Richmond	4,283	1,046	30	2,377
31	Shelburne	4,478	249	225	3,432
32	Victoria	4,146	769	625	2,180
33	Yarmouth	4,017	958	738	1,496
34	New Brunswick	4,145	977	364	2,148
35	Albert	4,689	578	307	3,303
36	Carleton	3,554	1,358	200	1,628
37	Charlotte	4,503	281	983	2,198
38	Gloucester	4,262	658	396	2,470
39	Kent	3,430	659	303	1,822
40	Kings	4,908	1,431	806	2,028
41	Madawaska	3,989	896	291	2,247
42	Norumberland	4,761	592	337	2,960
43	Queens	3,597	670	467	1,760
44	Restigouche	4,961	1,398	251	2,597
45	St. John	6,747	2,317	267	1,977
46	Sunbury	5,226	1,162	357	2,779
47	Victoria	2,966	934	- 32	1,408
48	Westmorland	4,767	1,055	321	2,664
49	York	3,837	558	247	2,264
50	Quebec	4,816	1,922	396	1,805
51	Abitibi	5,088	1,404	396	2,500
52	Argenteuil	5,341	2,260	275	2,203

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971

Average income from government transfers			Average investment income			Other income	No.
From family allowances	From old age pensions	From other government transfers	From pensions	From bonds	Other sources		
5	6	7	8	9	10	11	
dollars							
155	113	62	30	210	77	36	1
177	127	321	28	59	13	24	2
179	155	362	49	62	8	37	3
204	154	282	1	5	0	31	4
221	82	390	5	72	7	3	5
131	101	105	0	29	14	0	6
164	0	82	0	109	515	0	7
97	75	209	1	108	6	12	8
180	96	278	10	28	2	0	9
188	50	451	0	88	0	0	10
-	-	-	-	-	-	-	11
147	159	116	40	94	20	30	12
127	249	134	6	66	4	46	13
156	123	96	90	88	43	27	14
148	148	124	17	109	10	27	15
129	171	116	65	184	28	20	16
111	146	92	73	128	13	1	17
190	181	146	21	70	1	0	18
145	253	41	56	249	9	27	19
125	153	124	26	124	46	9	20
127	183	158	56	141	35	37	21
125	100	118	18	365	22	12	22
178	94	130	0	83	23	6	23
129	185	59	60	212	60	38	24
164	223	275	25	54	4	3	25
132	131	80	166	260	40	25	26
100	206	74	27	164	20	1	27
122	196	136	116	180	14	30	28
104	197	0	57	101	26	0	29
154	119	317	0	155	13	72	30
179	126	35	0	227	5	0	31
133	242	53	72	77	35	0	32
83	292	232	75	166	11	36	33
165	146	104	29	138	43	32	34
135	164	39	31	119	12	0	35
163	79	29	3	60	21	12	36
108	362	163	87	143	59	118	37
211	140	240	0	100	40	9	38
176	159	180	1	53	16	31	39
131	156	62	65	148	20	58	40
287	82	152	1	7	19	6	41
141	285	187	54	191	3	11	42
111	140	26	63	223	81	55	43
241	62	257	0	106	36	14	44
63	191	18	0	1,914	0	0	45
119	205	91	109	105	46	252	46
195	124	80	11	223	10	14	47
148	145	122	48	106	141	17	48
143	176	63	9	300	59	18	49
263	88	90	28	131	51	41	50
351	84	204	32	38	24	55	51
194	148	43	10	169	32	8	52

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Average total operator income	Average employment income		
			From farming	Non-farm self-employment	Wages and salaries
		1	2	3	4
			dollars		
	Quebec - Continued:				
1	Arthabaska	4,696	2,489	410	1,229
2	Bagot	4,823	2,381	287	1,620
3	Beauce	4,036	1,659	386	1,468
4	Beauharnois	7,759	3,198	802	2,941
5	Bellechasse	3,910	1,840	305	1,207
6	Berthier	4,200	1,546	406	1,608
7	Bonaventure	4,135	986	414	1,969
8	Brome	4,993	1,038	290	2,975
9	Chamblay	5,894	1,144	1,126	1,933
10	Champlain	4,183	1,928	355	1,363
11	Charlevoix-Est	3,941	1,147	463	1,560
12	Charlevoix-Ouest	5,305	878	667	1,335
13	Châteauguay	6,275	2,821	589	2,217
14	Chicoutimi	5,614	1,622	399	2,723
15	Compton	4,669	1,879	384	1,777
16	Deux-Montagnes	6,421	2,544	484	2,568
17	Dorchester	3,834	1,642	400	1,244
18	Drummond	4,688	1,987	270	1,807
19	Frontenac	4,553	2,064	351	1,577
20	Gaspé-Est	3,958	321	375	2,042
21	Gaspé-Ouest	4,326	398	529	2,630
22	Gatineau	5,385	1,214	420	2,864
23	Hull	6,269	409	464	3,638
24	Huntingdon	6,144	1,854	720	2,763
25	Iberville	5,964	3,099	680	1,596
26	Île-de-Montréal et Île-Jésus	6,697	1,409	542	2,146
27	Îles-de-la-Madeleine	4,029	184	656	2,112
28	Joliette	5,548	2,738	363	1,813
29	Kamouraska	3,874	2,128	208	879
30	Labelle	4,892	1,643	537	2,020
31	Lac-St-Jean-Est	4,738	2,012	182	2,057
32	Lac-St-Jean-Ouest	4,421	1,923	266	1,592
33	Laprairie	4,779	1,828	663	1,502
34	L'Assomption	5,209	2,224	332	1,696
35	Lévis	4,504	2,003	33	1,854
36	L'Islet	4,129	1,491	371	1,466
37	Lotbinière	4,463	1,776	415	1,750
38	Maskinongé	4,444	1,801	342	1,743
39	Matane	4,707	2,201	255	1,446
40	Matapédia	3,860	1,656	314	1,128
41	Mégantic	4,192	1,728	260	1,621
42	Missisquoi	5,134	2,413	337	1,836
43	Montcalm	4,268	1,895	338	1,503
44	Montmagny	4,715	1,904	631	1,597
45	Montmorency n° 1	4,221	1,117	616	1,778
46	Montmorency n° 2	4,498	1,825	451	1,743
47	Napierville	4,981	2,249	134	1,983
48	Nicolet	4,673	2,221	425	1,335
49	Papineau	4,542	1,557	573	1,755
50	Pontiac	4,812	1,265	237	2,735
51	Portneuf	4,677	2,107	310	1,682
52	Québec	6,670	1,082	808	4,076
53	Richelieu	4,564	1,411	295	2,273
54	Richmond	6,136	2,548	350	2,670
55	Rimouski	4,358	1,803	480	1,337
56	Rivière-du-Loup	3,743	1,749	243	1,150
57	Rouville	6,115	2,598	485	2,284
58	Saguenay	6,182	1,987	571	2,634
59	St-Hyacinthe	5,750	2,983	528	1,749
60	St-Jean	5,615	1,697	945	2,117
61	St-Maurice	4,245	1,562	425	1,723
62	Shelford	4,964	1,842	465	1,864
63	Sherbrooke	5,617	1,632	877	2,522

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

Average income from government transfers			Average investment income			Other income	No.
From family allowances	From old age pensions	From other government transfers	From pensions	From bonds	Other sources		
5	6	7	8	9	10	11	
dollars							
296	61	45	28	69	33	37	1
251	57	24	16	154	30	3	2
274	77	91	3	41	20	16	3
244	99	38	3	230	201	4	4
303	64	88	11	64	11	18	5
213	98	62	17	142	48	59	6
278	132	311	10	13	15	9	7
161	110	42	3	194	138	41	8
177	192	37	179	586	464	57	9
220	98	63	10	76	16	54	10
189	226	178	0	8	146	23	11
221	188	282	806	43	4	881	12
229	87	62	28	191	27	125	13
333	154	103	3	79	71	126	14
276	83	83	4	80	47	55	15
231	77	30	45	305	60	76	16
285	87	69	10	73	8	16	17
267	90	92	8	108	30	30	18
307	64	119	2	30	10	28	19
297	148	653	0	33	0	89	20
272	212	185	0	82	9	9	21
225	152	149	28	249	67	16	22
187	198	112	1,148	85	36	0	23
197	129	46	82	185	136	32	24
161	41	33	0	141	98	14	25
175	115	22	36	1,562	557	134	26
294	137	639	0	7	0	0	27
245	103	48	64	108	59	6	28
303	90	85	33	110	17	22	29
359	56	143	3	51	70	9	30
268	71	71	2	20	18	36	31
343	67	135	2	25	46	22	32
188	101	14	119	296	35	32	33
230	67	31	34	393	158	43	34
291	93	15	67	158	10	0	35
277	65	113	8	118	19	201	36
289	67	54	17	64	12	18	37
206	144	59	6	68	17	56	38
323	76	178	163	18	33	14	39
367	48	298	0	18	13	17	40
297	70	78	3	73	22	40	41
241	100	39	24	79	52	12	42
214	79	37	6	115	60	16	43
282	79	90	2	75	31	23	44
192	135	182	2	115	76	8	45
253	84	26	0	52	24	41	46
236	105	32	8	138	81	16	47
245	88	60	20	120	18	140	48
196	91	44	4	98	186	39	49
182	164	72	17	80	34	24	50
214	119	78	7	114	23	24	51
176	132	98	2	224	69	3	52
230	79	73	24	110	40	30	53
294	75	38	8	85	38	30	54
318	82	186	2	82	23	46	55
325	49	141	0	40	26	21	56
249	66	33	56	209	80	55	57
265	128	191	0	391	0	15	58
207	37	9	17	171	46	4	59
100	99	53	55	261	110	76	60
186	114	42	37	98	15	49	61
260	49	76	21	225	154	8	62
203	119	42	0	168	40	15	63

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Average total operator income	Average employment income		
			From farming	Non-farm self-employment	Wages and salaries
		1	2	3	4
			dollars		
	Quebec - Concluded:				
1	Soulanges	4,226	1,717	444	1,208
2	Stanstead	5,434	1,813	390	2,162
3	Témiscamingue	5,464	1,809	531	2,438
4	Témiscouata	4,245	1,680	233	1,527
5	Terrebonne	5,387	1,748	233	2,181
6	Vaudreuil	5,465	2,308	336	1,868
7	Verchères	5,324	1,973	465	2,017
8	Wolfe	4,974	1,655	355	2,386
9	Yamaska	4,604	2,477	237	1,362
10	Ontario	6,000	1,708	530	2,933
11	Algoma	5,641	343	257	4,437
12	Brant	7,301	2,881	426	3,157
13	Bruce	4,805	1,602	504	2,100
14	Cochrane	5,741	539	406	4,218
15	Dufferin	4,821	1,201	447	2,532
16	Dundas	5,149	1,730	493	2,360
17	Durham	5,785	1,104	633	3,179
18	Elgin	6,727	2,997	684	2,321
19	Essex	7,011	1,756	645	3,842
20	Frontenac	6,504	1,097	795	3,715
21	Glengarry	5,517	2,067	369	2,581
22	Grenville	5,189	611	353	3,351
23	Grey	4,383	1,258	348	2,125
24	Haldimand	5,420	1,415	271	2,969
25	Haliburton	4,174	106	374	2,924
26	Halton	7,851	1,092	505	4,140
27	Hastings	5,232	1,222	570	2,796
28	Huron	4,724	1,706	339	2,047
29	Kenora	5,654	1,012	471	3,849
30	Kent	6,332	2,618	413	2,589
31	Lambton	6,056	1,660	426	3,181
32	Lanark	4,701	623	493	2,800
33	Leeds	5,233	1,343	408	2,857
34	Lennox & Addington	5,758	1,101	641	3,237
35	Manitowlin	4,338	859	936	1,897
36	Middlesex	6,688	2,163	564	3,060
37	Muskoka	5,822	996	972	3,361
38	Niagara	6,822	1,471	408	4,015
39	Nipissing	5,784	1,445	409	3,410
40	Norfolk	7,687	3,843	734	2,433
41	Northumberland	5,144	1,183	517	2,717
42	Ontario	7,408	1,354	940	4,132
43	Ottawa - Carleton	7,308	1,904	560	3,385
44	Oxford	6,459	2,825	355	2,486
45	Parry Sound	4,419	875	599	2,337
46	Peel	10,477	1,787	847	4,855
47	Perth	5,216	2,394	471	1,622
48	Peterborough	5,692	1,074	645	3,201
49	Prescott	5,448	2,151	595	2,113
50	Prince Edward	5,879	2,338	509	2,325
51	Rainy River	5,223	933	771	3,041
52	Renfrew	4,359	998	376	2,394
53	Russell	6,134	2,648	611	2,349
54	Simcoe	5,494	1,048	482	3,128
55	Stormont	5,043	1,459	493	2,558
56	Sudbury	7,370	533	443	5,557
57	Thunder Bay	7,091	1,689	632	4,018
58	Timiskaming	4,531	1,220	452	2,364
59	Toronto	13,864	1,604	1,458	5,762
60	Victoria	5,075	695	489	3,090
61	Waterloo	6,912	2,690	511	2,740

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

Average income from government transfers			Average investment income			Other income	No.
From family allowances	From old age pensions	From other government transfers	From pensions	From bonds	Other sources		
5	6	7	8	9	10	11	
dollars							
186	106	35	16	378	89	47	1
261	91	143	105	409	35	25	2
377	84	137	14	24	19	30	3
404	48	235	14	26	57	21	4
226	77	91	165	423	164	79	5
202	126	32	111	341	129	13	6
238	89	31	28	342	91	33	7
264	62	159	8	47	10	27	8
228	110	49	20	95	17	11	9
134	129	50	48	281	142	44	10
150	130	61	36	188	26	13	11
129	126	62	27	327	145	22	12
143	125	66	18	166	66	16	13
193	120	40	61	83	75	8	14
131	120	30	26	218	104	12	15
123	135	30	17	182	46	34	16
130	158	45	63	231	186	55	17
132	112	25	73	258	86	40	18
138	132	41	37	280	99	40	19
115	180	60	118	279	110	36	20
140	152	52	37	94	17	9	21
115	181	135	85	179	100	77	22
127	132	65	26	203	75	25	23
127	147	44	29	269	138	12	24
138	211	75	57	215	75	0	25
125	135	37	71	843	790	113	26
136	157	88	40	156	58	18	27
141	105	43	33	217	64	29	28
151	29	58	15	24	38	13	29
124	126	26	28	270	97	42	30
125	151	76	36	237	101	64	31
116	192	54	152	187	54	30	32
115	174	33	31	165	76	31	33
120	144	50	191	189	57	27	34
104	174	81	22	103	120	42	35
119	141	30	62	350	173	26	36
77	170	18	43	119	63	2	37
124	158	48	63	303	158	73	38
192	89	86	16	82	47	8	39
133	90	40	13	245	104	52	40
124	137	58	56	229	80	45	41
127	120	40	54	358	216	67	42
143	133	60	113	458	202	80	43
137	101	34	23	341	121	35	44
116	182	113	38	77	70	13	45
123	124	41	77	1,588	880	155	46
144	100	27	51	296	84	27	47
139	133	49	47	243	122	38	48
164	111	30	94	103	46	41	49
118	133	78	94	214	30	42	50
162	112	81	62	48	2	12	51
137	162	89	14	109	46	34	52
209	49	53	22	56	48	89	53
130	116	76	51	275	127	61	54
149	147	39	11	101	52	35	55
190	138	81	46	128	116	138	56
154	122	103	26	217	54	74	57
186	84	53	23	35	97	18	58
- 83	117	0	1,181	1,270	2,341	49	59
115	167	82	44	251	100	42	60
162	89	42	48	395	189	46	61

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

No.	Area	Average total operator income	Average employment income		
			From farming	Non-farm self-employment	Wages and salaries
		1	2	3	4
			dollars		
	Ontario - Concluded:				
1	Wellington	5,355	1,446	456	2,685
2	Wentworth	7,647	1,009	1,018	4,349
3	York	8,222	1,183	1,052	4,247
4	Manitoba	3,756	1,440	339	1,452
5	Division No. 1	4,546	1,441	418	2,185
6	" " 2	3,785	1,360	483	1,369
7	" " 3	3,608	2,044	219	812
8	" " 4	4,205	2,321	293	1,083
9	" " 5	4,044	366	331	2,799
10	" " 6	3,951	978	345	1,876
11	" " 7	3,997	1,901	237	1,296
12	" " 8	4,358	1,990	353	1,425
13	" " 9	4,753	1,245	542	2,355
14	" " 10	2,785	1,170	276	818
15	" " 11	3,012	1,384	214	881
16	" " 12	3,320	1,095	251	1,514
17	" " 13	3,581	2,260	183	641
18	" " 14	3,154	1,638	253	819
19	" " 15	3,082	1,298	276	1,072
20	" " 16	5,367	83	1,076	3,592
21	" " 17	3,791	1,571	494	1,279
22	" " 18	3,251	1,370	423	1,053
23	" " 19	3,476	1,067	299	1,609
24	" " 20	5,264	486	286	3,716
25	Saskatchewan	3,933	1,831	337	1,191
26	Division No. 1	4,163	2,034	366	1,136
27	" " 2	3,679	1,648	341	1,053
28	" " 3	3,676	1,740	301	1,004
29	" " 4	4,980	2,821	420	1,146
30	" " 5	3,443	1,513	277	1,186
31	" " 6	4,252	1,829	317	1,415
32	" " 7	328	1,867	241	1,026
33	" " 8	4,634	2,329	324	1,257
34	" " 9	3,076	1,392	262	975
35	" " 10	3,186	1,379	340	988
36	" " 11	4,282	1,825	402	1,401
37	" " 12	4,279	2,169	354	1,150
38	" " 13	4,711	2,366	476	1,270
39	" " 14	3,875	1,691	335	1,351
40	" " 15	4,110	1,782	338	1,441
41	" " 16	3,415	1,592	319	1,022
42	" " 17	4,375	2,211	431	1,146
43	" " 18	3,395	1,046	580	1,220
44	Alberta	4,790	1,721	454	2,025
45	Division No. 1	5,490	2,616	612	1,530
46	" " 2	5,719	2,785	214	2,034
47	" " 3	6,031	2,616	545	2,168
48	" " 4	6,115	3,486	495	1,553
49	" " 5	5,661	2,869	362	1,775
50	" " 6	6,384	1,821	601	3,116
51	" " 7	4,231	2,084	336	1,218
52	" " 8	4,766	1,697	533	1,892
53	" " 9	9,166	3,523	859	1,745
54	" " 10	3,925	1,652	356	1,447
55	" " 11	5,371	1,401	546	2,740

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Continued

Average income from government transfers			Average investment income			Other income	No.
From family allowances	From old age pensions	From other government transfers	From pensions	From bonds	Other sources		
5	6	7	8	9	10	11	
dollars							
150	105	29	28	274	145	36	1
127	139	53	41	491	343	77	2
134	101	25	42	610	727	101	3
129	105	51	12	163	38	27	4
175	88	58	6	134	24	17	5
150	78	45	11	198	50	42	6
136	91	28	20	213	31	14	7
117	100	30	3	211	37	10	8
119	125	80	23	140	38	23	9
136	112	58	24	256	52	24	10
123	106	32	6	194	48	53	11
125	103	40	9	207	82	25	12
123	113	53	31	197	82	14	13
117	131	54	6	171	13	30	14
104	89	42	2	229	35	31	15
133	98	95	14	72	26	21	16
115	98	41	4	160	27	53	17
117	133	56	1	103	22	9	18
129	113	44	8	105	24	12	19
143	114	73	58	53	106	69	20
110	118	33	9	127	35	14	21
124	95	61	2	77	14	32	22
125	130	67	19	63	17	80	23
100	194	28	39	348	85	0	24
127	110	46	12	208	40	31	25
130	105	25	5	205	85	73	26
123	125	30	6	254	54	45	27
125	103	37	7	301	35	23	28
119	115	21	16	241	29	53	29
122	120	45	9	138	24	10	30
127	102	46	22	317	55	22	31
120	106	37	13	251	37	30	32
119	110	27	8	325	63	73	33
108	108	62	4	126	17	22	34
119	104	37	11	151	40	18	35
128	111	39	22	296	42	17	36
119	104	37	9	274	45	18	37
157	89	66	14	213	41	20	38
127	121	55	18	113	31	34	39
144	111	62	16	170	26	20	40
126	115	62	6	108	42	24	41
132	118	55	20	173	38	50	42
183	175	52	16	56	7	59	43
138	105	49	22	187	61	29	44
132	48	31	70	307	87	57	45
157	102	40	33	248	61	46	46
138	139	46	25	247	65	44	47
129	100	18	15	271	40	25	48
129	89	26	23	293	71	25	49
126	110	37	44	344	141	45	50
137	106	19	16	192	76	29	51
133	125	55	29	233	54	25	52
112	109	250	13	2,519	33	0	53
126	113	32	11	120	51	27	54
139	105	58	27	234	92	29	55

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Concluded

No.	Area	Average total operator income	Average employment income		
			From farming	Non-farm self-employment	Wages and salaries
		1	2	3	4
			dollars		
	Alberta - Concluded:				
1	Division No. 12.	3,790	1,124	413	1,815
2	" " 13.	3,882	1,068	443	1,928
3	" " 14.	5,049	718	690	3,060
4	" " 15.	4,075	890	478	2,219
5	British Columbia	6,769	1,026	667	4,077
6	Alberni - Clayoquot	7,251	709	597	5,360
7	Bulkley - Nechako	6,027	437	843	3,939
8	Capital.	7,007	510	841	4,387
9	Cariboo	4,907	681	618	3,021
10	Central Fraser Valley	8,347	1,726	841	4,887
11	Central Kootenay	5,988	497	895	3,668
12	Central Okanagan	6,152	732	380	3,829
13	Columbia - Shuswap	6,372	1,049	496	3,580
14	Comox - Strathcona	6,101	284	489	4,303
15	Cowichan Valley	7,069	679	1,194	3,988
16	Dewdney - Alouette	7,955	1,533	1,001	4,512
17	East Kootenay	5,805	1,396	580	2,993
18	Fraser - Cheam	7,944	2,157	886	3,571
19	Fraser - Fort George	6,911	194	709	5,192
20	Greater Vancouver	8,056	1,092	682	5,086
21	Kitimat - Stikine	7,671	1,057	426	5,431
22	Kootenay Boundary	5,808	1,086	425	3,677
23	Mount Waddington.	2,854	- 30	1,405	1,079
24	Nanaimo.	6,519	213	499	4,696
25	North Okanagan	5,408	566	459	3,324
26	Ocean Falls	4,051	271	350	2,652
27	Okanagan-Similkameen	5,975	943	594	3,168
28	Peace River - Liard	4,841	522	354	3,417
29	Powell River	7,374	- 20	808	5,817
30	Skeena A	4,583	503	1,033	2,809
31	Squamish - Lillooet.	6,636	879	1,048	4,124
32	Sunshine Coast	10,896	- 227	948	5,605
33	Thompson - Nicola	8,252	1,612	409	5,275

TABLE A.3.2. Components of Census-farm Operator Income and Average Income Contributions of Each Component, Canada, Provinces and Census Divisions, 1971 - Concluded

Average income from government transfers			Average investment income			Other income	No.
From family allowances	From old age pensions	From other government transfers	From pensions	From bonds	Other sources		
5	6	7	8	9	10	11	
dollars							
169	79	87	11	44	28	22	1
136	103	54	18	87	24	21	2
134	144	75	38	86	97	6	3
149	110	78	4	97	31	20	4
141	117	108	72	357	147	57	5
156	79	80	43	43	136	47	6
199	52	84	21	158	161	132	7
104	179	84	115	495	226	25	8
136	76	73	44	88	52	18	9
155	95	98	122	252	130	40	10
127	185	76	48	357	127	8	11
143	117	91	49	489	288	35	12
148	122	86	46	419	294	121	13
127	129	190	144	335	88	13	14
130	149	158	66	494	127	84	15
141	141	122	64	266	125	50	16
114	154	48	178	310	15	17	17
160	89	153	49	555	137	166	18
154	52	62	26	332	175	14	19
129	137	70	81	608	147	43	20
180	123	54	6	221	105	67	21
123	95	113	33	218	27	10	22
163	0	95	0	97	45	0	23
122	157	159	140	341	174	9	24
130	148	134	85	386	138	38	25
83	237	283	0	117	59	0	26
111	147	149	90	511	196	65	27
155	84	87	13	81	67	59	28
134	92	68	261	126	89	0	29
101	60	38	0	41	0	0	30
155	0	17	0	26	39	348	31
216	0	0	30	4,172	182	0	32
130	133	104	35	278	211	64	33

TABLE A.3.3. Ratio of Average Total Income of Census-farm Operators Who Report Wages and Salaries as a Major Source to Operators Reporting Farming as a Major Source, by Economic Class of Farm and Type of Farm, Canada and Provinces, 1971

No.	Area	Part A - Economic class				
		Total	Less than \$2,500	\$2,500 - 4,999	\$5,000 - 9,999	\$10,000 and over
1	Canada	1.90	3.05	2.41	2.15	2.06
2	Newfoundland	1.58	2.38	2.32	1.70	1.60
3	Prince Edward Island . . .	1.67	2.41	1.89	2.00	1.71
4	Nova Scotia	1.56	2.60	1.84	1.53	2.03
5	New Brunswick	1.69	2.78	2.82	1.41	1.65
6	Quebec	1.61	2.16	1.82	1.76	1.92
7	Ontario	1.76	2.88	2.42	2.08	1.95
8	Manitoba	2.01	3.16	2.31	2.15	2.36
9	Saskatchewan	1.98	2.97	2.43	2.27	2.23
10	Alberta	2.00	3.46	2.74	2.29	2.20
11	British Columbia	1.69	3.58	2.79	2.37	1.49

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

TABLE A.3.3. Ratio of Average Total Income of Census-farm Operators Who Report Wages and Salaries as a Major Source to Operators Reporting Farming as a Major Source, by Economic Class of Farm and Type of Farm, Canada and Provinces, 1971

Part B - Type of farm								No.
Total	Dairy	Cattle	Poultry	Wheat	Other field crops	Fruit and vegetable	Other	
1.96	1.79	2.11	1.71	2.17	1.82	1.56	2.13	1
1.74	1.94	1.86	0.99	-	1.87	1.45	3.26	2
1.79	1.33	2.04	1.80	-	2.18	-	1.20	3
1.70	1.80	2.35	1.47	-	1.30	1.28	1.81	4
1.70	1.70	1.74	1.71	-	1.93	1.88	1.48	5
1.75	1.76	1.86	1.75	-	1.45	1.85	1.73	6
1.79	1.90	2.16	1.80	3.16	1.42	1.42	1.69	7
2.06	1.59	2.13	1.73	2.29	1.93	2.04	2.75	8
2.04	2.20	2.07	1.82	2.12	1.97	-	2.22	9
2.06	2.06	2.13	1.91	2.21	1.89	2.66	2.10	10
1.59	1.49	2.40	1.11	1.20	1.89	1.74	1.82	11

Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

APPENDIX A.4

APPENDIX CHARTS TO CHAPTER 4

Chart A.4.1

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Residence, Canada and Provinces, 1971

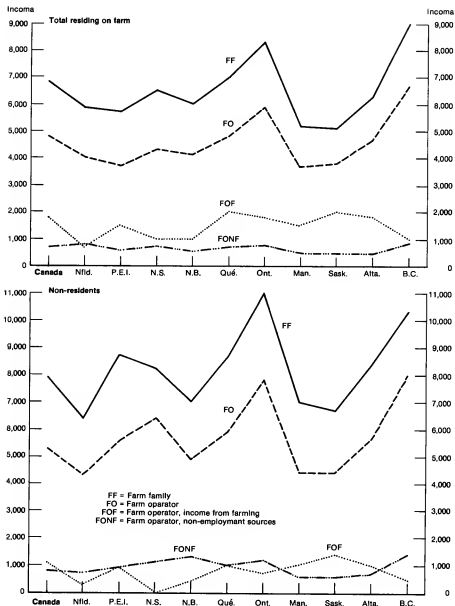


Chart A.4.1 (continued)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Residence, Canada and Provinces, 1971

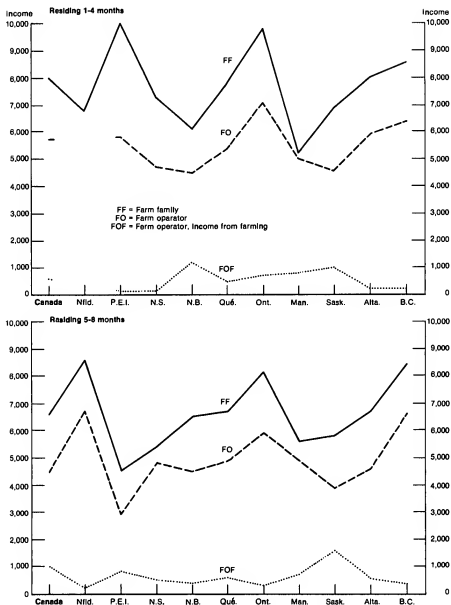
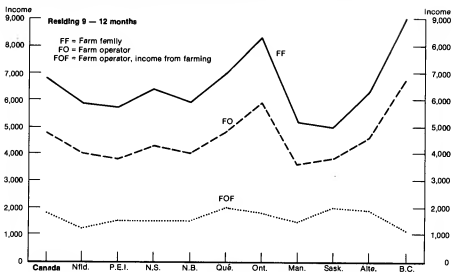


Chart A.4.1 (concluded)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming and Non-employment Sources, by Residence, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from Agriculture-Population Linkage.

Chart A.4.2

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Capital Value of Farms, Canada and Provinces, 1971

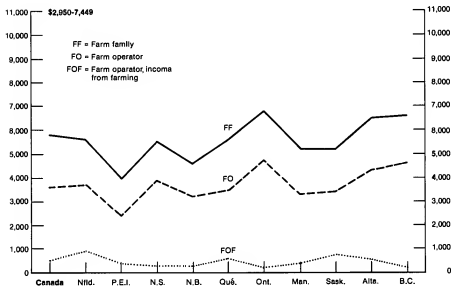
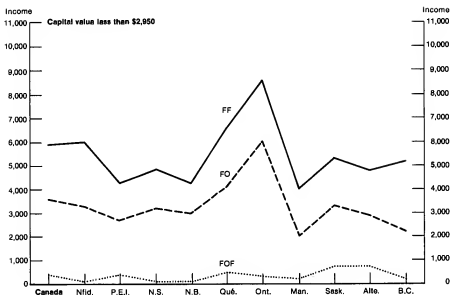


Chart A.4.2 (continued)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Capital Value of Farms, Canada and Provinces, 1971

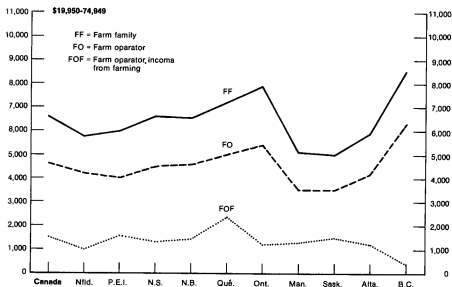
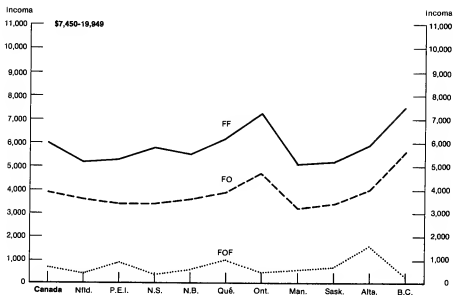
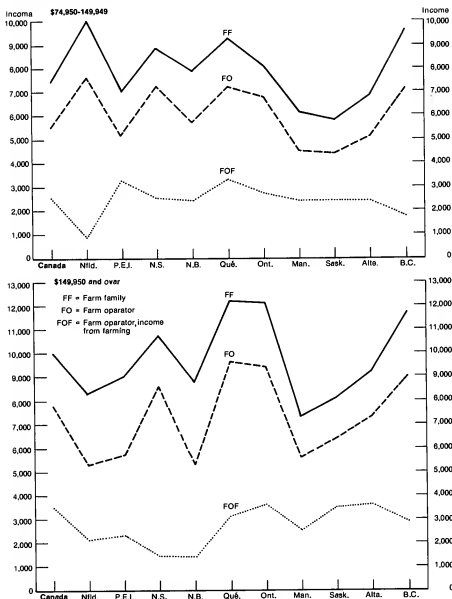


Chart A.4.2 (concluded)

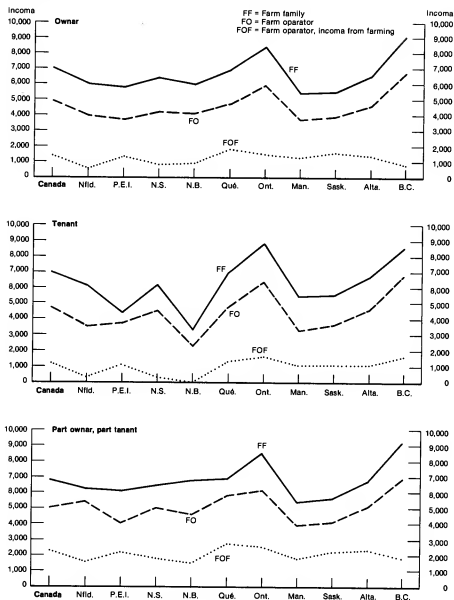
Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Capital Value of Farms, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart A.4.3

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Tenure, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

Chart A.4.4

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Type of Farm, Canada and Provinces, 1971

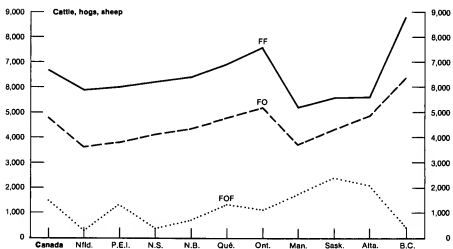
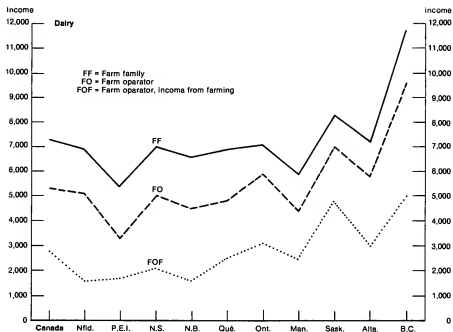


Chart A.4.4 (continued)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Type of Farm, Canada and Provinces, 1971

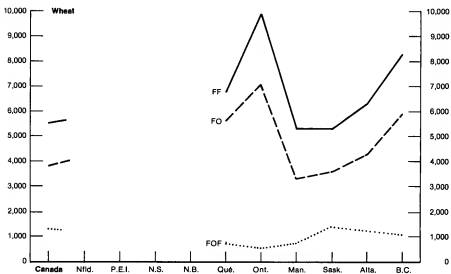
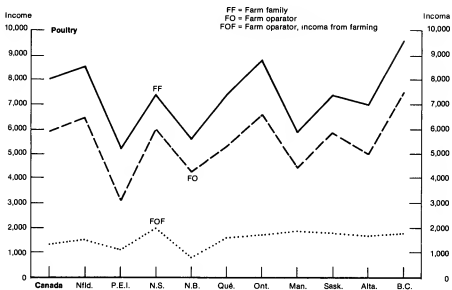
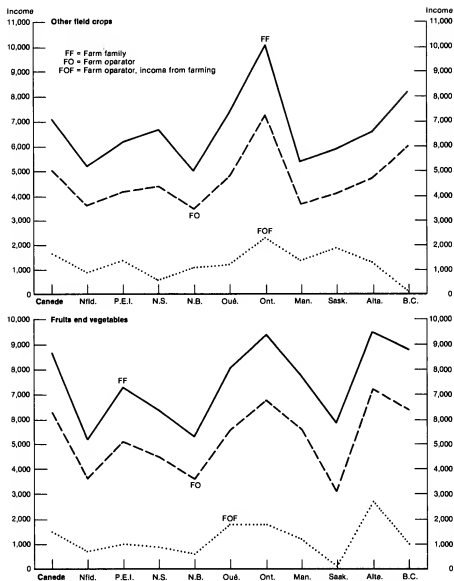


Chart A.4.4 (concluded)

Average Total Census-farm Family and Census-farm Operator Income, and Average Census-farm Operator Income from Farming, by Type of Farm, Canada and Provinces, 1971



Source: Statistics Canada, 1971 Census, unpublished tabulation drawn from the Agriculture-Population Linkage.

APPENDIX A.5

GLOSSARY OF TERMS

Capital values — This is the value of census-farm capital: land and buildings, machinery and equipment (including automobiles), livestock and poultry. Census-farm operators were asked to give a value for land and buildings, farm machinery and equipment on their holding regardless of tenure. The value reported was to be an estimate of the market value, not the original, replacement or assessed value.

The value of land and buildings was to be the value of the property when used for agricultural purposes. For areas surrounding cities or towns, the real estate value for non-agricultural purposes of the census-farm property was not to be reported.

The value to be reported for farm machinery was the present market value — that is, the amount for which the equipment and machinery would sell if there was a willing buyer and a willing seller, and not a forced sale. It might be explained as the price the machine would likely bring, in its present condition at an auction sale. The original or replacement value was not to be reported unless it conformed with the market value.

The total value of machinery and equipment includes the value of items not reported separately as well as the value of the machines which were reported separately. The value of irrigation equipment on the holdings is included in the total value.

Values for the livestock and poultry reported in the census were compiled from data on average farm values for various types of livestock and poultry obtained by the Agriculture Division of Statistics Canada.

Census division — Includes a variety of titles such as the administrative units of the provinces of Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario called "counties"; British Columbia's regional districts; Ontario's regional municipalities, territorial districts, district municipality and metropolitan municipality; and finally the use of the title "census division" itself, created by Statistics Canada in collaboration with the provincial governments of Newfoundland, Manitoba, Saskatchewan, and Alberta, since these provinces do not possess administrative units comparable to the counties of other provinces. The few regional and district municipalities in Ontario were created by the Ontario Government beginning in 1969, while legislation forming the 29 new regional districts in British Columbia replacing the former 10 census divisions was completed in 1968.

Census-farm — An agricultural holding of at least one acre and sales of agricultural products during the preceding 12 months of \$50 or more.

Census-farm areas – The area of census-farms reported for each subdivision represents the area of land operated by farmers whose headquarters are in the subdivision.

Class of worker – Classification of respondents by their participation in the labour force according to their main form of employment. The period of reference is the week prior to enumeration for those employed, or otherwise, any time since January 1, 1970 for the job or business of longest duration.

Crop land – Included in this item is the total area of crop land sown or to be sown for harvest in 1971. Acreages from which sod was being sold are also included in this item rather than in other improved land as in 1966. Crop land includes the total area of all field crops, plus the areas of fruits, vegetables, greenhouses, mushroom houses and nursery products. Because some crops are reported in fractions of an acre, there may be slight differences between the sum of the individual crop acreages and the total crop land. Where intercropping or double cropping is practised, the land area was to be reported only once in the category "area under crops" but the areas of each crop are included with the individual crop acreages.

Economic class of farm – The grouping of all census-farms, except institutional farms and community pastures, on the basis of their gross value of agricultural products sold in 1970. (See Catalogues 96-701 to 96-711 for counts of institutional farms and community pastures.)

Employment income – Refers to the total income received in 1970 as wages and salaries, net income from a business or professional practice and/or net farm income.

Family – A census family consists of a husband and wife (with or without children who have never been married, regardless of age) or a parent with one or more children never married, living in the same dwelling. A family may consist also of a man or woman living with a guardianship child or ward under 21 years for whom no pay was received.

Farm population – All persons living in a dwelling situated on a census-farm (as defined in the census) were considered to be farm population, regardless of their occupation. In the case of institutions located on a census-farm, only the manager, hired agricultural workers and members of their households were included in this population. Persons living on census-farms that were located in cities, towns and villages were included with the census-farm population of the adjoining rural subdivision.

Head – For census purposes, every household must have a head. This is the husband if both husband and wife are present, the parent (regardless of age or dependency) if living with unmarried children, or any member of a group sharing a dwelling equally. The household head may or may not be the family head as well. A person occupying a dwelling alone is always reported as the head.

Household — For census purposes, a household consists of a person or group of persons occupying one dwelling. It usually consists of a family group with or without lodgers, employees, etc. However, it may consist of two or more families sharing a dwelling, of a group of unrelated persons or of one person living alone. Every person is a member of some household and there is a one-to-one relationship between households and occupied dwellings except in the case of certain special households, such as those of military and diplomatic personnel stationed overseas, from which no housing information was collected.

The census classifies households into two main groups: (i) the household which consists of one person or a small group of persons occupying an ordinary dwelling, usually spoken of as a private household, and (ii) the "collective" type household which includes hotels, lodging-houses of 10 or more lodgers, institutions, hospitals, or military camps, lumber camps and other establishments of a similar nature. Unless otherwise specified, these "collective" households are excluded from household reports.

Income — Persons 15 years and over were asked to report total income received during the calendar year 1970 from each of the sources explained below:

- (i) **Wages and salaries** (amount before deductions for income tax, pensions, unemployment insurance, etc.) — Includes military pay and allowances, tips, commissions and bonuses and piece-rate payments received during 1970, but excludes free room and board or other payments in kind.
- (ii) **Net income from self-employment (non-farm)** (gross receipts minus expenses of operations) — Amounts received from own non-farm unincorporated businesses or from a professional practice during 1970. In the case of partnerships, only the respondent's share was to be included.
- (iii) **Net income from farm operation** (gross receipts minus expenses of operations including depreciation) — Amounts received from the operation of a farm, either for own account or in partnership, during 1970. Advance, supplementary or assistance payments to farmers (including Lower Inventory for Tomorrow program payments) by federal or provincial governments were to be included.
 - (a) **Family and youth allowances** — The amount received from this source is to be included in the family head's income although reported by the wife. Provincial as well as federal allowances are included.
 - (b) **Government old age pensions, Canada pensions and Quebec pensions** — Includes Guaranteed Income Supplement.
 - (c) **Other government payments** — Includes all other government transfer payments from all levels of government such as unemployment insurance, veterans' pensions and allowances, welfare, workmen's compensation, mothers' allowances, etc.
 - (d) **Retirement pensions from previous employment** — Includes all regular income received as a result of previous employment of the respondents

or a deceased relative. Includes pensions to retired civil servants, RCMP or career military personnel, and all annuities regardless of who purchased them but excludes lump-sum payments.

- (e) **Bond and deposit interest and dividends** – Includes interest from deposits in banks, trust companies, co-operatives, Credit Unions, etc., as well as bond and debenture interest and all dividends.
- (f) **Other investment income** – Includes net rents from real estate, mortgage and loan interest, regular income from an estate or trust fund, and interest from insurance policies.
- (g) **Other income** – Includes regular income from alimony, child support, net income from roomers and boarders, pensions and other non-investment income from abroad, scholarships, etc.
- (h) **Income in kind** – Estimate of the value of farm goods produced and consumed without a monetary transaction.

Industry – The industry classes are based on the general nature of the business carried on in the establishment where the respondent was employed as indicated by the reporting of the name of the employer (or by the business name if self-employed) and the kind of business, industry or service engaged in by this establishment. If not employed in the week prior to enumeration, the information was to relate to the respondent's job of longest duration since January 1, 1970. Persons with two or more jobs were to report the information for the job at which they worked the most hours.

Industry is not to be confused with occupation, which refers to the kind of work the person was doing, as determined by the reporting of the kind of work, the description of the most important duties and the job title.

Improved land – The area of improved land consists of the total of the areas reported for the following four land categories: crop land, improved pasture, summer fallow, and other improved land.

Labour force, employed – Refers to all non-inmates 15 years and over who, during the week prior to enumeration, worked for pay or profit, or in unpaid family work, or had a job from which they were temporarily absent because of illness, vacation, strike, etc.

Labour force, unemployed – Consists of all non-inmates 15 years and over, who, during the week prior to enumeration, were not working but were "looking for work", or were "on temporary lay-off".

Livestock and poultry – Livestock and poultry were reported on the census-farms where they were located, regardless of ownership, except for livestock kept on community pastures. In this case, livestock are related to the holding of the operator owning them rather than to the community pasture.

When reporting the number of cows and heifers kept mainly for milking purposes, the enumerators were instructed to include "cows and heifers", two years and over, milking or to be milked and "heifers", one year and under two years, being raised mainly for milk production regardless of whether or not they were of dairy breeding.

Machinery and equipment – The number and value were to be reported for agricultural machines on the holding at the census date, regardless of whether the machines were owned by the operator or someone else. Old machines no longer being used were not to be reported. Equipment owned in partnership was to be reported on the census-farm where it was located.

Major source of income – That component which constitutes the largest proportion of the total income reported by the respondent.

Non-family persons – This term refers to those living alone; those living with unrelated individuals and those living with relatives but not in a husband-wife or parent-unmarried child relationship.

Not in labour force – Refers to persons 15 years and over who are inmates, students, housewives, retired workers, seasonal workers enumerated in an "off" season who are not looking for work, unpaid female workers helping less than 20 hours in a family farm or business, or persons who cannot work because of long-term physical or mental illness or disability.

Occupation – Refers to the specific type of work the person did on the job, as determined by the reporting of the kind of work, the description of the most important duties and the job title. Data relate to the respondent's job in the week prior to enumeration if he or she had a job during that week or to the job of longest duration since January 1, 1970 if not employed in that week. Persons with two or more jobs during the reference week were asked to give the information for the one at which they worked the most hours.

Occupational classification – A classification system based on the *Canadian Classification and Dictionary of Occupations* was used in the 1971 Census. Unit groups to which occupations are classified in this system were formed to have a "desirable degree of homogeneity with respect to kind of work performed". Although work performed may be influenced by a particular industrial process, the classification of individuals by their type of work is theoretically independent of the nature of business of the establishment in which it is carried on. In most cases, self-employed individuals, reporting their kind of work, are classified to the relevant unit group in the same fashion as employees.

Off-farm work during 1970 – Two questions relating to all off-farm work performed during 1970 by the census-farm operator were asked. First, "How many days did you (the operator) work off this holding at paid agricultural and non-agricultural work during 1970?". Exchange work was not to be included. The

second asked for the "kind of paid off-farm work done during 1970 and number of days worked at each". For agricultural work off the holding, custom work was to be included.

Operator – Person responsible for the day-to-day decisions made in running a census-farm, whether as an owner, tenant or hired manager. As only one operator was listed for each holding, the number of operators is the same as the number of census-farms. Where the holding was operated by more than one person, as in the case of a partnership, only one of them was regarded as the operator.

Residence of operator – The length of time the operator lived on the holding during the 12-month period prior to the census was recorded as nine to 12 months, five to eight months, one to four months or did not live on this holding.

Selected expenditures – These expenditures, whether paid in cash or obtained on credit, were reported for each census-farm for the year 1970. Cash wages paid to hired agricultural labour did not include amount paid for housework, custom work and construction labour. Custom work was to be included with the item "machine rental, custom work, or contract work". Taxes were the amount levied on all agricultural property owned and operated by the respondent on June 1, 1971 whether paid or not. Rent was on all rented or leased agricultural property operated by the respondent on that same date. Fuel and oil used for farm purposes did not include that used for automobiles. Finally, lime was not included in commercial fertilizer purchased.

Tenure of land – Agricultural holdings are classified by tenure depending on whether the operator owns, rents or leases from others or both. Area owned includes land that the operator or his wife holds under title, homestead law, purchase contract, or as heir or trustee of any individual estate and land more or less permanently occupied by a squatter. Areas rented or leased from others include land rented or leased from others on a cash basis, rented on a share crop basis from others, areas used rent free, and areas used under lease arrangement with federal, provincial or municipal governments. Note that land used under a per-head grazing fee is not included.

Total income – Refers to the total income received during 1970 from wages and salaries, business or professional practice, farm operations, family and youth allowances, government old age pensions, other government payments, retirement pensions from previous employment, bond and deposit interest and dividends, other investment sources, and other sources. In the case of "family" income it refers to the sum of the incomes received by all members of the family 15 years and over. (See Income Questions from Census of Population, on page 276.)

Type of farm – With the exception of institutional farms and community pastures, all census-farms in 1971 with \$2,500 or more of agricultural sales were classified on the basis of product type. In order for a farm to be included in a

particular product type, it must have derived 51% or more of its total agricultural sales in 1970 from that product. The determination of product types was done in the following order of priority: dairy; cattle, hogs and sheep; poultry; wheat; small grains; field crops, other than small grains; fruits and vegetables; forestry; miscellaneous specialty; livestock combination; field crops combination; and other combinations. (See Catalogues 96-701 to 96-711 for the complete definition.)

Urban — Includes the population living in (i) incorporated cities, towns and villages with a population of 1,000 or over; (ii) unincorporated places of 1,000 or over having a population density of at least 1,000 per square mile; (iii) the built-up fringes of (i) and (ii) having a minimum population of 1,000 and a density of at least 1,000 per square mile.

Value of agricultural products sold — Respondents were instructed to report the value of all agricultural products sold during 1970 (whether received by the operator or some other person). They were to include cash advances for stored grain, deficiency payments and patronage dividends for the particular products involved. For tenant-operated farms, the landlord's share of products sold was to be included. Products of an institutional farm or Hutterite Colony used by the same were considered sold and an estimate of their value recorded in the appropriate question.

40. INCOME FOR 1970 (State in dollars only)

- (a) During 1970 what were your total wages and salaries, commissions, bonuses, tips, etc.? (*before any deductions*)

Amount \$ /00 ☐ None

- (b) During 1970 what was your net income from self-employment or operating your own non-farm business or professional practice? *State total business income less expenses of operation.*

If lost money, give amount and write "Loss".

Amount \$ /00 ☐ None

- (c) During 1970 what was your net income from operating a farm on your own account or in partnership? *State total farm income less expenses of operation. If lost money, give amount and write "Loss".*

Amount \$ /00 ☐ None

- (d) During 1970 how much income did you receive from:

1. Family and youth allowances?

Amount \$ /00 ☐ None

2. Government old age pensions, Canada pensions, and Quebec pensions?

Amount \$ /00 ☐ None

3. Other government income? (*e.g., unemployment insurance, veterans' pensions and allowances, welfare*)

Amount \$ /00 ☐ None

4. Retirement pensions from previous employment?

Amount \$ /00 ☐ None

5. Bond and deposit interest and dividends?

Amount \$ /00 ☐ None

6. Other investment income? (*e.g., net rents*)

Amount \$ /00 ☐ None

7. Other income? (*e.g., alimony*)

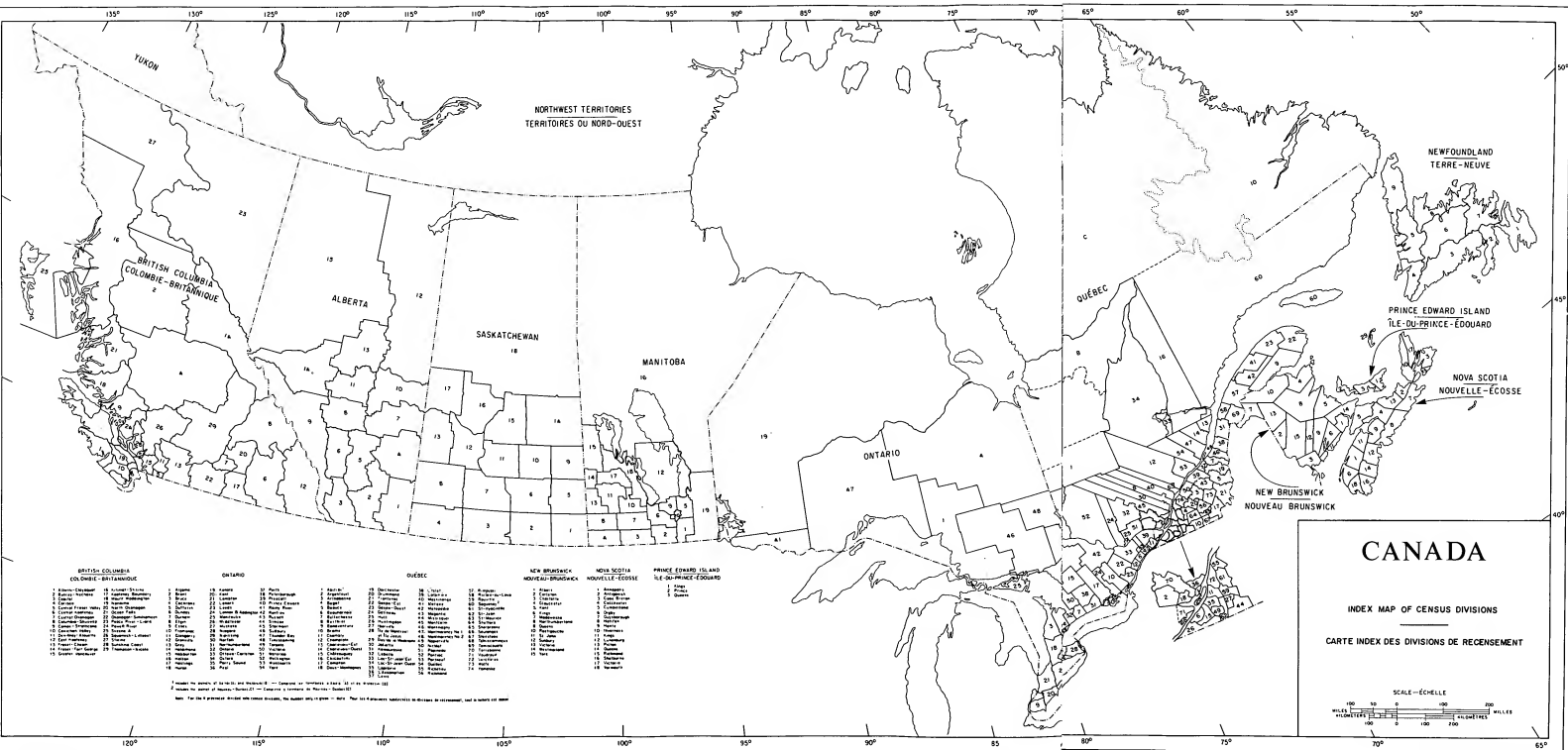
Amount \$ /00 ☐ None

- (e) During 1970 what was your total income? ($a + b + c + d$)

Amount \$ /00 ☐ None

APPENDIX A.6

INDEX MAP OF CENSUS DIVISIONS OF CANADA



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